

风云三号（03 批）气象卫星地面应用系统工程

E 星全球导航卫星掩星探测仪-II 型

L1 数据产品特性卡  
(GNSS 反射)

(V0.9.5)

编写： 杨光林

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会签： \_\_\_\_\_

批准： \_\_\_\_\_

国家卫星气象中心

2021 年 08 月

|             |                                                 |          |
|-------------|-------------------------------------------------|----------|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |          |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |          |
|             | 所属主题: L1 数据产品                                   | 页码: 2/38 |

### 文档修改记录

| 版本号    | 日期         | 修改者        | 修 改 描 述                                                                                                                                                                                                                                                                                                                                                                     |
|--------|------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V0.8   | 2020-11-24 | 杨光林、肖贤俊、郑鑫 | 初始版本                                                                                                                                                                                                                                                                                                                                                                        |
| V0.9   | 2020-12-23 | 杨光林、肖贤俊、郑鑫 | 统一格式, 增加数据集描述                                                                                                                                                                                                                                                                                                                                                               |
| V0.9.1 | 2021.01.06 | 杨光林、肖贤俊、郑鑫 | 修改填充值、文件名                                                                                                                                                                                                                                                                                                                                                                   |
| V0.9.2 | 2021-01-25 | 杨光林、肖贤俊、郑鑫 | 重新分组、修改文件名、页面页脚                                                                                                                                                                                                                                                                                                                                                             |
| V0.9.3 | 2021-03-17 | 杨光林、肖贤俊、郑鑫 | 修改 Sp_alt、Ddm_quality_flag、Direct_signal_noise 有效范围;<br>修改 Rx_channel_status 的数据集属性                                                                                                                                                                                                                                                                                         |
| V0.9.4 | 2021-06-08 | 杨光林、肖贤俊、郑鑫 | 修改 Ddm_sp_les 和 Ddm_sp_Dles 长文件名、修改 Tx_pos_x、Tx_pos_y、Tx_pos_z、Tx_vel_x、Tx_vel_y、Tx_vel_z、Ddm_doppler_refer、Ddm_effective_area、Ddm_peak_delay、Ddm_peak_doppler、Ddm_quality_flag、Sp_delay_doppler_flag 等描述信息; 修改 Sp_surface_type 有效范围和描述信息、修改 Ddm_sp_row 和 Ddm_sp_column、Ddm_peak_row、Ddm_peak_column 有效范围; 增加 3 个数据集 Ddm_power_factor、Ddm_brcs_factor、Ddm_sp_normalized_snr |
| V0.9.5 | 2021-08-18 | 杨光林、肖贤俊、郑鑫 | 文件属性:<br>修改 Agc_Mode 的值, 修改私有属性 Incoherent_Times 数据类型<br>数据集:<br>修改 Tx_pos_x 等备注<br>数据集名: Sp_fresnel_coeff 改为 Sp_fresnel_coeff_square;<br>Ddm_sp_dopp 改为 Ddm_sp_doppler<br>修改 Ddm_time_utc 有效范围<br>Rx_attitude_status 和 Rx_fly_direction 整个数据集                                                                                                                              |
|        | 2022-01-25 | 黄飞雄        | SDS54 sp_rcg 修改为 sp_tcg                                                                                                                                                                                                                                                                                                                                                     |
|        | 2022-04-19 | 黄飞雄        | SDS24 增加 GAL 系统的 block 说明                                                                                                                                                                                                                                                                                                                                                   |

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|-------------|-------------------------------------------------|----------|
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|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |          |
|             | 所属主题: L1 数据产品                                   | 页码: 3/38 |

# 1 FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据 (GNSS 反射)

## 1.1 数据概况

表1. FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据 (GNSS 反射) 概况表

|            |                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 产品名称       | FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据(GNSS 反射)                                                                                                                                                                                                                                                                                                                                                                         |
|            | L1 data of GNOS GNSS Reflectometry                                                                                                                                                                                                                                                                                                                                                                            |
| 物理意义 (中英文) | GNOS GNSS 反射 L1 数据提供了利用时延-多普勒相关功率波形计算得到的镜面反射点处归一化双基雷达散射截面及相关辅助信息。产品主要内容包括 GNSS 反射事件发生时间及位置、反射 GNSS 卫星号、反射 GNSS 卫星位置和速度、FY-3E 卫星位置和速度、镜面反射点处归一化双基雷达散射截面及 LES 等。                                                                                                                                                                                                                                                |
|            | GNSS Reflectometry (GNSS-R) L1 data of FY-3 E GNOS provides the Normalized Bistatic Radar Cross sections (NBRCS) and the related auxiliary data for each GNSS-R Specular. The products include the occurrence time and position of GNSS reflection, the PRN number of the reflection GNSS satellite with its position and velocity, the position and velocity of FY-3E satellite, the NBRCS of each Specular. |
| 用途 (中英文)   | 用于计算海面风速产品。                                                                                                                                                                                                                                                                                                                                                                                                   |
|            | Calculations for the sea surface wind speed product.                                                                                                                                                                                                                                                                                                                                                          |
| 用户 (中英文)   | 数值天气预报及研究人员                                                                                                                                                                                                                                                                                                                                                                                                   |
|            | Numerical weather forecaster and researcher                                                                                                                                                                                                                                                                                                                                                                   |
| 备注 (中英文)   |                                                                                                                                                                                                                                                                                                                                                                                                               |
|            |                                                                                                                                                                                                                                                                                                                                                                                                               |

## 1.2 数据基本信息

表2. FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据(GNSS 反射) 基本信息表

|                                                                                                               |
|---------------------------------------------------------------------------------------------------------------|
| 产品名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据 (GNSS 反射)                                                                  |
| 文件名约定:<br>FY3E_GNOSR_ORBT_L1_YYYYMMDD_HHmm_RFL*#_Vn.HDF<br>其中, *表示发生反射的导航星座名称, *取值为 G 时表示为 GPS 星座, *取值为 C 时表示 |

|             |                                                 |          |
|-------------|-------------------------------------------------|----------|
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|             | 所属主题: L1 数据产品                                   | 页码: 4/38 |

为北斗星座, \*取值为 E 时表示为 Galileo 星座; #为通道号。

| 栏目      | 值    | 备注 |
|---------|------|----|
| 卫星名     | FY3E |    |
| 仪器名称    | GNOS |    |
| 数据区域类型  | ORBT |    |
| 数据级别    | L1   |    |
| 分辨率     | --   |    |
| 数据格式名称  | HDF  |    |
| 更新频率    | ~224 |    |
| 更新频率单位  | 个/天  |    |
| 分块方式    | 1/2圈 |    |
| 单个文件数据量 | ~250 |    |
| 数据量单位   | MB   |    |

## 2 L1 数据规格

### 2.1 HDF 数据格式结构

表3. FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据 (GNSS 反射) HDF 结构

| 全局文件属性   |        |                |                               |                                                                                    |
|----------|--------|----------------|-------------------------------|------------------------------------------------------------------------------------|
| 私有文件属性   |        |                |                               |                                                                                    |
| 科学数据集    |        |                |                               |                                                                                    |
| 分组名称     | 科学数据集名 |                | 科学数据集英文描述                     | 科学数据集中文描述                                                                          |
| Time     | SDS1   | Sample_num     | Sample number of DDM          | DDM 采集序号, 序号起始值为 0                                                                 |
|          | SDS2   | Ddm_track_id   | DDM track number              | 将同一 GNSS 卫星的连续不中断的 DDM 波形数据, 称为一个轨迹, 按一个轨迹内起始 DDM 波形数据的起始时间大小对不同的轨迹进行编号, 起始轨迹编号为 0 |
|          | SDS3   | Ddm_time_utc   | DDM sample time - UTC         | DDM 采集中间时刻对应的 UTC 时间                                                               |
|          | SDS4   | Ddm_gps_week   | DDM sample time - GPS week    | DDM 采集中间时刻对应的 GPS 周                                                                |
|          | SDS5   | Ddm_gps_second | DDM sample time - GPS seconds | DDM 采集中间时刻对应的 GPS 秒                                                                |
| Receiver | SDS6   | Rx_clk_bias    | Receiver clock bias           | DDM 采集中间时刻对应的接收机的钟差                                                                |

|                    |                                                                 |                 |
|--------------------|-----------------------------------------------------------------|-----------------|
| <b>FY3 数据产品特性卡</b> | 文件名: <a href="#">L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射)</a> |                 |
|                    | 特性集名称: <a href="#">FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</a>           |                 |
|                    | 所属主题: <a href="#">L1 数据产品</a>                                   | 页码: <b>5/38</b> |

|                 |                    |                    |                                                    |                           |                                     |
|-----------------|--------------------|--------------------|----------------------------------------------------|---------------------------|-------------------------------------|
| <b>Receiver</b> | SDS7               | Rx_clk_bias_rate   | Receiver clock bias rate                           | DDM 采集中间时刻对应的接收机的钟漂       |                                     |
|                 | SDS8               | Rx_pos_x           | Spacecraft position X at DDM sample time           | DDM 采集中间时刻对应的低轨卫星位置 X 分量  |                                     |
|                 | SDS9               | Rx_pos_y           | Spacecraft position Y at DDM sample time           | DDM 采集中间时刻对应的低轨卫星位置 Y 分量  |                                     |
|                 | SDS10              | Rx_pos_z           | Spacecraft position Z at DDM sample time           | DDM 采集中间时刻对应的低轨卫星位置 Z 分量  |                                     |
|                 | SDS11              | Rx_vel_x           | Spacecraft velocity X at DDM sample time           | DDM 采集中间时刻对应的低轨卫星速度 X 分量  |                                     |
|                 | SDS12              | Rx_vel_y           | Spacecraft velocity Y at DDM sample time           | DDM 采集中间时刻对应的低轨卫星速度 Y 分量  |                                     |
|                 | SDS13              | Rx_vel_z           | Spacecraft velocity Z at DDM sample time           | DDM 采集中间时刻对应的低轨卫星速度 Z 分量  |                                     |
|                 | SDS14              | Rx_lon             | Sub-satellite point longitude                      | DDM 采集中间时刻对应的低轨卫星的经度      |                                     |
|                 | SDS15              | Rx_lat             | Sub-satellite point latitude                       | DDM 采集中间时刻对应的低轨卫星的纬度      |                                     |
|                 | SDS16              | Rx_alt             | Spacecraft altitude                                | DDM 采集中间时刻对应的低轨卫星的高度      |                                     |
|                 | SDS17              | Rx_attitude_status | Spacecraft attitude_status                         | DDM 采集中间时刻对应的低轨卫星姿态状态     |                                     |
|                 | SDS18              | Rx_fly_direction   | Spacecraft fly direction                           | DDM 采集中间时刻对应的低轨卫星飞行方向     |                                     |
|                 | SDS19              | Rx_pitch           | Spacecraft attitude pitch angle at DDM sample time | DDM 采集中间时刻对应的低轨卫星俯仰角      |                                     |
|                 | SDS20              | Rx_yaw             | Spacecraft attitude yaw angle at DDM sample time   | DDM 采集中间时刻对应的低轨卫星偏航角      |                                     |
|                 | SDS21              | Rx_roll            | Spacecraft attitude roll angle at DDM sample time  | DDM 采集中间时刻对应的低轨卫星翻滚角      |                                     |
|                 | <b>Transmitter</b> | SDS22              | Gnss_prn_code                                      | GNSS PRN code             | 用于生成 DDM 波形的 GNSS 卫星 PRN 码          |
|                 |                    | SDS23              | Gnss_svn_num                                       | GNSS space vehicle number | 用于生成 DDM 波形的 GNSS 卫星 SV 码           |
|                 |                    | SDS24              | Gnss_block_flag                                    | GNSS block code           | 用于生成 DDM 波形的 GNSS 卫星批次代码            |
|                 |                    | SDS25              | Tx_pos_x                                           | GNSS Tx position X        | DDM 采集中间时刻对应的信号发射时刻的 GNSS 卫星位置 X 分量 |
|                 |                    | SDS26              | Tx_pos_y                                           | GNSS Tx position Y        | DDM 采集中间时刻对应的信号发射时刻的 GNSS 卫星位置 Y 分量 |
|                 |                    | SDS27              | Tx_pos_z                                           | GNSS Tx position Z        | DDM 采集中间时刻对应的信号发射时刻的 GNSS 卫星位置 Z 分量 |

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|-------------|-----------------------------------------------------------------|
| FY3 数据产品特性卡 | 文件名: <a href="#">L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射)</a> |
|             | 特性集名称: <a href="#">FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</a>           |
|             | 所属主题: <a href="#">L1 数据产品</a>                                   |
|             | 页码: <b>6/38</b>                                                 |

|          |                         |                                                                  |                                                      |                                     |
|----------|-------------------------|------------------------------------------------------------------|------------------------------------------------------|-------------------------------------|
|          | SDS28                   | Tx_vel_x                                                         | GNSS Tx velocity X                                   | DDM 采集中间时刻对应的信号发射时刻的 GNSS 卫星速度 X 分量 |
|          | SDS29                   | Tx_vel_y                                                         | GNSS Tx velocity Y                                   | DDM 采集中间时刻对应的信号发射时刻的 GNSS 卫星速度 Y 分量 |
|          | SDS30                   | Tx_vel_z                                                         | GNSS Tx velocity Z                                   | DDM 采集中间时刻对应的信号发射时刻的 GNSS 卫星速度 Z 分量 |
| Specular | SDS31                   | Sp_lat                                                           | Specular point latitude                              | 镜面反射点的纬度                            |
|          | SDS32                   | Sp_lon                                                           | Specular point longitude                             | 镜面反射点的经度                            |
|          | SDS33                   | Sp_alt                                                           | Specular point altitude                              | 镜面反射点的高度                            |
|          | SDS34                   | Sp_pos_x                                                         | Specular point position X                            | 镜面反射点位置的 X 分量                       |
|          | SDS35                   | Sp_pos_y                                                         | Specular point position Y                            | 镜面反射点位置的 Y 分量                       |
|          | SDS36                   | Sp_pos_z                                                         | Specular point position Z                            | 镜面反射点位置的 Z 分量                       |
|          | SDS37                   | Sp_vel_x                                                         | Specular point velocity X                            | 镜面反射点速度的 X 分量                       |
|          | SDS38                   | Sp_vel_y                                                         | Specular point velocity Y                            | 镜面反射点速度的 Y 分量                       |
|          | SDS39                   | Sp_vel_z                                                         | Specular point velocity Z                            | 镜面反射点速度的 Z 分量                       |
|          | SDS40                   | Sp_inc_angle                                                     | Specular point incidence angle                       | 镜面反射点处 GNSS 信号入射角                   |
|          | SDS41                   | Sp_theta_orbit                                                   | Specular point orbit frame theta angle               | 镜面反射点在轨道坐标系中的高度角                    |
|          | SDS42                   | Sp_az_orbit                                                      | Specular point orbit frame azimuth angle             | 镜面反射点在轨道坐标系中的方位角                    |
|          | SDS43                   | Sp_theta_body                                                    | Specular point body frame theta angle                | 镜面反射点在卫星本体坐标系中高度角                   |
|          | SDS44                   | Sp_az_body                                                       | Specular point body frame azimuth angle              | 镜面反射点在卫星本体坐标系方位角                    |
|          | SDS45                   | Sp_theta_antenna                                                 | Specular point antenna frame theta angle             | 镜面反射点在天线坐标系中的高度角                    |
|          | SDS46                   | Sp_az_antenna                                                    | Specular point antenna frame azimuth angle           | 镜面反射点在天线坐标系中的方位角                    |
|          | SDS47                   | Sp_theta_pattern                                                 | Specular point antenna pattern frame elevation angle | 镜面反射点在方向图坐标系中的高度角                   |
|          | SDS48                   | Sp_az_pattern                                                    | Specular point antenna pattern frame azimuth angle   | 镜面反射点在方向图坐标系中的方位角                   |
|          | SDS49                   | Sp_antenna_gain                                                  | Specular point reflection antenna gain               | 镜面反射点接收机天线增益                        |
|          | SDS50                   | Sp_surface_type                                                  | Specular point surface type                          | 镜面反射点处地物类型                          |
| SDS51    | Sp_fresnel_coeff_square | Square of Fresnel power reflection coefficient at specular point | 镜面反射点处菲涅尔反射系数模的平方                                    |                                     |
| SDS52    | Rx_sp_range             | Rx to specular point range                                       | 接收机与镜面反射点间距离                                         |                                     |
| SDS53    | Tx_sp_range             | Tx to specular point range                                       | GNSS 卫星与镜面反射点                                        |                                     |

|             |                                                                                  |
|-------------|----------------------------------------------------------------------------------|
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|             | 特性集名称: <a href="#">FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</a>                            |
|             | 所属主题: <a href="#">L1 数据产品</a> <span style="float: right;">页码: <b>7/38</b></span> |

|         |       |                       |                                        |                      |
|---------|-------|-----------------------|----------------------------------------|----------------------|
|         |       |                       |                                        | 间距离                  |
|         | SDS54 | Sp_tcg                | Total corrected gain at specular point | 镜面反射点处的全修正增益         |
| Channel | SDS55 | Direct_antenna_id     | Direct antenna id                      | 直射通道天线标识             |
|         | SDS56 | Direct_signal_noise   | Direct signal noise                    | 直射通道信号噪底             |
|         | SDS57 | Direct_signal_snr     | Direct signal to noise ratio           | 直射通道信号的信噪比           |
|         | SDS58 | Rx_channel_statuses   | Rx channel status                      | 反射通道占用状态             |
| DDM     | SDS59 | Ddm_range_refer       | Ddm range reference                    | DDM 伪距参考值            |
|         | SDS60 | Ddm_doppler_refer     | Ddm doppler reference                  | DDM 多普勒参考值           |
|         | SDS61 | Ddm_raw_data          | DDM bin raw counts                     | DDM 波形数据             |
|         | SDS62 | Ddm_noise_source      | DDM noise source                       | DDM 噪底数据源            |
|         | SDS63 | Ddm_noise_raw         | DDM noise raw                          | DDM 噪底原始采样值          |
|         | SDS64 | Ddm_noise_m           | DDM noise m                            | DDM 噪底 M 值           |
|         | SDS65 | Ddm_peak_raw          | DDM peak raw                           | DDM 峰值原始采样值          |
|         | SDS66 | Ddm_sp_raw            | DDM specular point raw                 | DDM 镜面反射点原始采样值       |
|         | SDS67 | Ddm_peak_snr          | DDM peak snr                           | DDM 峰值信噪比            |
|         | SDS68 | Ddm_sp_snr            | DDM specular point snr                 | DDM 镜面反射点信噪比         |
|         | SDS69 | Ddm_effective_area    | DDM effective scattering area          | DDM 有效散射面积           |
|         | SDS70 | Ddm_sp_les            | DDM specular point LES                 | DDM 波形前沿斜率           |
|         | SDS71 | Ddm_sp_dles           | DDM specular point DLES                | DDM 波形前沿二阶导数         |
|         | SDS72 | Ddm_quality_flag      | DDM quality flag                       | DDM 质量标识符            |
|         | SDS73 | Ddm_sp_nbrcs          | DDM specular point NBRCS               | 镜面反射点归一化双基雷达散射截面     |
|         | SDS74 | Ddm_sp_row            | DDM specular point row                 | DDM 镜面反射点的行位置        |
|         | SDS75 | Ddm_sp_column         | DDM specular point column              | DDM 镜面反射点的列位置        |
|         | SDS76 | Ddm_sp_delay          | DDM delay at specular point            | DDM 镜面反射点的时延         |
|         | SDS77 | Ddm_sp_doppler        | DDM doppler at specular point          | DDM 镜面反射点的多普勒        |
|         | SDS78 | Ddm_peak_row          | DDM peak bin row                       | DDM 峰值点的行位置          |
|         | SDS79 | Ddm_peak_column       | DDM peak bin column                    | DDM 峰值点的列位置          |
|         | SDS80 | Ddm_peak_delay        | DDM peak bin delay                     | DDM 峰值点的时延           |
|         | SDS81 | Ddm_peak_doppler      | DDM peak bin doppler                   | DDM 峰值点的多普勒          |
|         | SDS82 | Sp_delay_doppler_flag | Specular point delay doppler flag      | DDM 波形镜面反射点判断可靠性的标识符 |
|         | SDS83 | Ddm_power_fact        | Factor used to compute                 | DDM 功率计算系数           |

|             |                                                |
|-------------|------------------------------------------------|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II型(GNSS 反射) |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品          |
|             | 所属主题: L1 数据产品                                  |
|             | 页码: 8/38                                       |

|       |                        |                                      |                  |
|-------|------------------------|--------------------------------------|------------------|
|       | or                     | DDM power                            |                  |
| SDS84 | Ddm_brcs_factor        | Factor used to compute DDM BRCS      | DDM 双基雷达散射截面计算系数 |
| SDS85 | Ddm_sp_normali zed_snr | Normalized SNR at DDM specular point | 归一化镜像点信噪比        |

## 2.2 全局文件属性

表4. FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据 (GNSS 反射) 全局文件属性定义

| 描述                | 属性名称                                | 数据类型                    | 数量  | 值                             |
|-------------------|-------------------------------------|-------------------------|-----|-------------------------------|
| 卫星名称              | Satellite Name                      | 8-bit signed char       | 不定长 | FY-3E                         |
| 仪器名称              | Sensor Name                         | 8-bit signed char       | 不定长 | GNOS                          |
| 传感器代码             | Sensor Identification Code          | 8-bit signed char       | 不定长 | GNOS II                       |
| 数据集名称             | Dataset Name                        | 8-bit signed char       | 不定长 | GNOS L1 GNSSR Data            |
| 文件名称              | File Name                           | 8-bit signed char       | 不定长 |                               |
| 文件别名              | File Alias Name                     | 8-bit signed char       | 不定长 | GNOS_L1                       |
| 产品生成地             | Responser                           | 8-bit signed char       | 不定长 | NSMC                          |
| 处理软件版本号           | Version Of Software                 | 8-bit signed char       | 不定长 | V1.0.0                        |
| 处理软件更新日期          | Software Revision Date              | 8-bit signed char       | 不定长 | YYYY-MM-DD                    |
| 定标参数版本号           | Version Of Calibration Parameter    | 8-bit signed char       | 不定长 |                               |
| 定标参数更新日期          | Calibration Parameter Revision Date | 8-bit signed char       | 不定长 | YYYY-MM-DD                    |
| 数据观测开始日期(包括年月日)   | Observing Beginning Date            | 8-bit signed char       | 不定长 | YYYY-MM-DD                    |
| 数据观测开始时间(包括时分秒毫秒) | Observing Beginning Time            | 8-bit signed char       | 不定长 | Hh:mm:ss.sss                  |
| 数据观测结束日期(包括年月日)   | Observing Ending Date               | 8-bit signed char       | 不定长 | YYYY-MM-DD                    |
| 数据观测结束时间(包括时分秒毫秒) | Observing Ending Time               | 8-bit signed char       | 不定长 | Hh:mm:ss.sss                  |
| 数据创建日期(包括年月日)     | Data Creating Date                  | 8-bit signed char       | 不定长 | YYYY-MM-DD                    |
| 数据创建时间(包括时分秒毫秒)   | Data Creating Time                  | 8-bit signed char       | 不定长 | Hh:mm:ss.sss                  |
| 白天夜间标志            | Day Or Night Flag                   | 8-bit signed char       | 不定长 | D:Day N:Night<br>M:Mixed      |
| 轨道号               | Orbit Number                        | 32-bit unsigned Integer | 1   |                               |
| 轨道周期(分钟)          | Orbit Period(min.)                  | 16-bit unsigned Integer | 1   | 102                           |
| 轨道方向              | Orbit Direction                     | 8-bit signed char       | 1   | A:Ascend D:Descend<br>M:Mixed |
| 数据完整性(0-5级)       | Data Integrity                      | 8-bit unsigned Integer  | 1   | 0为最好, 5为最差(具体定义参见注1)          |
| 总扫描线数             | Number Of Scans                     | 32-bit signed Integer   | 1   |                               |
| 白天模式扫描线数          | Number Of Day mode scans            | 32-bit signed Integer   | 1   | 注2                            |
| 晚上模式扫描线数          | Number of Night mode scans          | 32-bit signed Integer   | 1   | 注3                            |
| 处理成功的扫描线数         | Successfully pre-pressed Scans      | 32-bit signed Integer   | 1   | 注4                            |
| 地球椭球参考坐标系ID       | Reference Ellipsoid Model           | 8-bit signed char       | 定长  | WGS84                         |



|             |                                                |          |
|-------------|------------------------------------------------|----------|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II型(GNSS 反射) |          |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品          |          |
|             | 所属主题: L1 数据产品                                  | 页码: 9/38 |

| 描述                       | 属性名称                    | 数据类型                  | 数量  | 值                                                    |
|--------------------------|-------------------------|-----------------------|-----|------------------------------------------------------|
|                          | ID                      |                       |     |                                                      |
| 日地距离比                    | EarthSun Distance Ratio | 64-bit floating point | 1   |                                                      |
| 平近地点角                    | MeanAnomaly             | 64-bit floating point | 1   |                                                      |
| 平均运动                     | MeanMotion              | 64-bit floating point | 1   |                                                      |
| 偏心率                      | Eccentricity            | 64-bit floating point | 1   |                                                      |
| 近地点俯角                    | PerigeeArgument         | 64-bit floating point | 1   |                                                      |
| 升交点赤经                    | AscendingNodeLongitude  | 64-bit floating point | 1   |                                                      |
| 轨道倾角                     | OrbitalInclination      | 64-bit floating point | 1   |                                                      |
| 历元时间                     | EpochTime               | 64-bit floating point | 1   |                                                      |
| 轨道4个角点纬度                 | Orbit Point Latitude    | 32-bit floating point | 4   | NW,NE,SW,SE                                          |
| 轨道4个角点经度                 | Orbit Point Longitude   | 32-bit floating point | 4   | NW,NE,SW,SE                                          |
| 文件的附加说明(可以对文件的使用、创建人等说明) | AdditionalAnnotation    | 8-bit signed char     | 不定长 | Yang<br>Guanglin,010-6840693<br>4.yglyang@cma.gov.cn |

## 2.3 私有文件属性

表5. FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据 (GNSS 反射) 私有文件属性定义

| 描述          | 属性名称                  | 数据类型                   | 数量  | 值                                                                                            |
|-------------|-----------------------|------------------------|-----|----------------------------------------------------------------------------------------------|
| UTC 秒计时起始时间 | Utc_Second_Start_Time | 8-bit signed char      | 不定长 | 1980-01-06T00:00:00.00                                                                       |
| 时间分辨率       | Time_Resolution       | 32-bit floating point  | 1   | 1                                                                                            |
| 年积日         | Data_Doy              | 32-bit signed Integer  | 1   |                                                                                              |
| 数据持续时间      | Data_Duration         | 32-bit floating point  | 1   |                                                                                              |
| GNSS 系统     | Gnss_System           | 8-bit signed char      | 不定长 | GPS/ BDS /GAL                                                                                |
| GNSS 信号频率   | Gnss_Frequency        | 32-bit floating point  | 1   | Unit:Hz                                                                                      |
| GNSS 信号波长   | Gnss_Wavelength       | 32-bit floating point  | 1   | Unit:m                                                                                       |
| 反射通道 ID     | Reflection_Channel_ID | 8-bit unsigned Integer | 1   | 0-7                                                                                          |
| 接收机工作模式     | Receiver_Mode         | 8-bit unsigned Integer | 1   | 0: work without blackbody, 1: work with blackbody                                            |
| AGC 工作模式    | Agc_Mode              | 8-bit unsigned Integer | 1   | 0: Automatic Gain Control (AGM), 1:Programme gain mode (PGM)                                 |
| 是否因原始采样中断   | Raw_Mode_Flag         | 8-bit unsigned Integer | 1   | 0: No data is suspended by raw data sampling, 1: Part data is suspended by raw data sampling |
| 中频采样率       | Raw_Sampling          | 32-bit floating point  | 1   | unit: MHz                                                                                    |
| DDM 计时点     | Ddm_Time_Point        | 8-bit unsigned Integer | 1   | 0:DDM begin time, 1:DDM middle time, 2:DDM end time, 3:PVT time                              |

|                    |                                                        |                  |
|--------------------|--------------------------------------------------------|------------------|
| <b>FY3 数据产品特性卡</b> | 文件名: <b>L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射)</b> |                  |
|                    | 特性集名称: <b>FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</b>           |                  |
|                    | 所属主题: <b>L1 数据产品</b>                                   | 页码: <b>10/38</b> |

|                  |                                |                         |     |                                                                                                      |
|------------------|--------------------------------|-------------------------|-----|------------------------------------------------------------------------------------------------------|
| DDM 数据源          | Ddm_Source                     | 8-bit unsigned Integer  | 1   | 0:FY-3E GNOS in orbit data,<br>1:GREEPS simulation data,<br>2:GNSS simulator ground data,<br>3:other |
| DDM 时延分辨率        | Delay_Res                      | 32-bit floating point   | 1   | unit:chips                                                                                           |
| DDM 多普勒分辨率       | Doppler_Res                    | 8-bit unsigned Integer  | 1   | unit:Hz                                                                                              |
| DDM 时延类型         | Delay_Type                     | 8-bit unsigned Integer  | 1   | 0:non-uniform_DDM,<br>1:uniform_DDM                                                                  |
| DDM 时延非均匀范围      | Nonuniform_Delay_Range         | 32-bit floating point   | 1   | unit:chips                                                                                           |
| 时延采样点数           | Delay_Pixels                   | 8-bit unsigned Integer  | 1   | 122                                                                                                  |
| 多普勒频点数           | Doppler_Pixels                 | 8-bit unsigned Integer  | 1   | 20                                                                                                   |
| DDM 跟踪时延采样点      | Track_Delay_Pixel              | 8-bit unsigned Integer  | 1   | 62                                                                                                   |
| DDM 跟踪多普勒采样点     | Track_Doppler_Pixel            | 8-bit unsigned Integer  | 1   | 11                                                                                                   |
| 非相干积分次数          | Incoherent_Times               | 32-bit unsigned Integer | 1   | 1000                                                                                                 |
| 相干积分时间           | Coherent_Time                  | 8-bit unsigned Integer  | 1   | unit:ms                                                                                              |
| 镜面反射点最小纬度        | Min_Sp_Lat                     | 32-bit floating point   | 1   | unit:degree                                                                                          |
| 镜面反射点最大纬度        | Max_Sp_Lat                     | 32-bit floating point   | 1   | unit:degree                                                                                          |
| 镜面反射点最小经度        | Min_Sp_Lon                     | 32-bit floating point   | 1   | unit:degree                                                                                          |
| 镜面反射点最大经度        | Max_Sp_Lon                     | 32-bit floating point   | 1   | unit:degree                                                                                          |
| 接收机地面定标数据版本      | Calibration_Version            | 8-bit unsigned char     | 不定长 | v1.0                                                                                                 |
| GNSS EIRP 数据版本   | Eirp_Version                   | 8-bit unsigned char     | 不定长 | v1.0                                                                                                 |
| 估计海面温度的数据集版本     | Sss_Version                    | 8-bit unsigned char     | 不定长 | v1.0                                                                                                 |
| 估计海面盐度的数据集版本     | Sst_Version                    | 8-bit unsigned char     | 不定长 | v1.0                                                                                                 |
| 估计大气吸收的数据集版本     | Atm_Attenu_Version             | 8-bit unsigned char     | 不定长 | v1.0                                                                                                 |
| 有效散射面积查找表版本      | Effective_Area_Version         | 8-bit unsigned char     | 不定长 | v1.0                                                                                                 |
| 反射面类型匹配版本        | Land_Type_Version              | 8-bit unsigned char     | 不定长 | v1.0                                                                                                 |
| GNSS 反射天线方向图数据版本 | Nardir_Antenna_Pattern_Version | 8-bit unsigned char     | 不定长 | v1.0                                                                                                 |
| PRN 与 SV 对应数据集版本 | Prn_Sv_Version                 | 8-bit unsigned char     | 不定长 | v1.0                                                                                                 |
| 海冰覆盖数据集版本        | Sea_Ice_Cover_Version          | 8-bit unsigned char     | 不定长 | v1.0                                                                                                 |
| 文件数据质量判断标识       | Bad_File_Flag                  | 8-bit unsigned Integer  | 1   | 0:The amounts of effective ddm is not zero, 1: The amounts of effective DDM is zero                  |

|             |                                                 |           |
|-------------|-------------------------------------------------|-----------|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |
|             | 所属主题: L1 数据产品                                   | 页码: 11/38 |

## 2.4 科学数据集

表6. FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据 (GNSS 反射) 科学数据集 (SDS) 定义

| SDS1. SDS 名称                   | 数据类型        | 维数        | 数据量(字节)                                                                                                                                                                              |
|--------------------------------|-------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sample_num<br>数据采集序号           | Int32       | [nscans]  | nscans*4                                                                                                                                                                             |
| <b>SDS 属性名</b>                 | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                             |
| FillValue                      | int32       | 1         | -2147483648                                                                                                                                                                          |
| Intercept                      | float32     | 1         | 0.0                                                                                                                                                                                  |
| Slope                          | float32     | 1         | 1.0                                                                                                                                                                                  |
| band_name                      | String      | 1         | "none"                                                                                                                                                                               |
| long_name                      | String      | 1         | "Sample number"                                                                                                                                                                      |
| units                          | String      | 1         | "none"                                                                                                                                                                               |
| valid_range                    | int32       | 2         | 0,86400                                                                                                                                                                              |
| Description                    | String      | 1         | "DDM sample sequence number"                                                                                                                                                         |
| SDS2. SDS 名称                   | 数据类型        | 维数        | 数据量(字节)                                                                                                                                                                              |
| Ddm_track_id<br>DDM Track ID 号 | Int32       | [nscans]  | nscans*4                                                                                                                                                                             |
| <b>SDS 属性名</b>                 | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                             |
| FillValue                      | int32       | 1         | -2147483648                                                                                                                                                                          |
| Intercept                      | float32     | 1         | 0.0                                                                                                                                                                                  |
| Slope                          | float32     | 1         | 1.0                                                                                                                                                                                  |
| band_name                      | String      | 1         | "none"                                                                                                                                                                               |
| long_name                      | String      | 1         | "DDM track id"                                                                                                                                                                       |
| units                          | String      | 1         | "none"                                                                                                                                                                               |
| valid_range                    | int32       | 2         | 0, 345600                                                                                                                                                                            |
| Description                    | String      | 1         | A track is a temporally contiguous series of DDMs that have the same prn_code. Each track in the file is assigned a unique track_id starting with zero. track_id ranges from 0 to N. |
| SDS3. SDS 名称                   | 数据类型        | 维数        | 数据量(字节)                                                                                                                                                                              |
| Ddm_time_utc<br>DDM 采集时间(UTC)  | float64     | [nscans]  | nscans*8                                                                                                                                                                             |
| <b>SDS 属性名</b>                 | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                             |
| FillValue                      | float64     | 1         | -9999.9                                                                                                                                                                              |
| Intercept                      | float64     | 1         | 0.0                                                                                                                                                                                  |
| Slope                          | float64     | 1         | 1.0                                                                                                                                                                                  |
| band_name                      | String      | 1         | "none"                                                                                                                                                                               |
| long_name                      | String      | 1         | "DDM sample time UTC"                                                                                                                                                                |
| units                          | String      | 1         | "s"                                                                                                                                                                                  |
| valid_range                    | float64     | 2         | 0.0, 1.9e9                                                                                                                                                                           |
| Description                    | String      | 1         | "The generation time of the DDM onboard."                                                                                                                                            |
| SDS4. SDS 名称                   | 数据类型        | 维数        | 数据量(字节)                                                                                                                                                                              |

|             |                                                                 |                  |
|-------------|-----------------------------------------------------------------|------------------|
| FY3 数据产品特性卡 | 文件名: <a href="#">L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射)</a> |                  |
|             | 特性集名称: <a href="#">FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</a>           |                  |
|             | 所属主题: <a href="#">L1 数据产品</a>                                   | 页码: <b>12/38</b> |

|                                  |             |           |                                                                                                                                               |
|----------------------------------|-------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Ddm_gps_week<br>DDM 采集时间 GPS 周   | Int32       | [nscans]  | nscans*4                                                                                                                                      |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                      |
| FillValue                        | int32       | 1         | -2147483648                                                                                                                                   |
| Intercept                        | float64     | 1         | 0.0                                                                                                                                           |
| Slope                            | float64     | 1         | 1.0                                                                                                                                           |
| band_name                        | String      | 1         | "none"                                                                                                                                        |
| long_name                        | String      | 1         | "DDM sample time - GPS week"                                                                                                                  |
| units                            | String      | 1         | "week"                                                                                                                                        |
| valid_range                      | int32       | 2         | 0, 3129                                                                                                                                       |
| Description                      | String      | 1         | "The GPS week of GPS time"                                                                                                                    |
| <b>SDS5. SDS 名称</b>              | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                |
| Ddm_gps_second<br>DDM 采集时间 GPS 秒 | float64     | [nscans]  | nscans*8                                                                                                                                      |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                      |
| FillValue                        | float64     | 1         | -9999.9                                                                                                                                       |
| Intercept                        | float64     | 1         | 0.0                                                                                                                                           |
| Slope                            | float64     | 1         | 1.0                                                                                                                                           |
| band_name                        | String      | 1         | "none"                                                                                                                                        |
| long_name                        | String      | 1         | "DDM sample time - GPS second"                                                                                                                |
| units                            | String      | 1         | "s"                                                                                                                                           |
| valid_range                      | float64     | 2         | 0, 604800                                                                                                                                     |
| Description                      | String      | 1         | "The GPS second of GPS time"                                                                                                                  |
| <b>SDS6. SDS 名称</b>              | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                |
| Rx_clk_bias<br>接收机的钟差            | float64     | [nscans]  | nscans*8                                                                                                                                      |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                      |
| FillValue                        | float64     | 1         | -9999.9                                                                                                                                       |
| Intercept                        | float64     | 1         | 0.0                                                                                                                                           |
| Slope                            | float64     | 1         | 1.0                                                                                                                                           |
| band_name                        | String      | 1         | "none"                                                                                                                                        |
| long_name                        | String      | 1         | "Receiver clock bias"                                                                                                                         |
| units                            | string      | 1         | "m"                                                                                                                                           |
| valid_range                      | float64     | 2         | 0.0, 100.0                                                                                                                                    |
| Description                      | String      | 1         | "The receiver clock bias (in seconds) multiplied by the speed of light as reported by the receiver, interpolated to ddm_time_utc, in meters." |
| <b>SDS7. SDS 名称</b>              | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                |
| Rx_clk_bias_rate<br>接收机的钟漂       | float64     | [nscans]  | nscans*8                                                                                                                                      |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                      |
| FillValue                        | float64     | 1         | -9999.9                                                                                                                                       |
| Intercept                        | float64     | 1         | 0.0                                                                                                                                           |
| Slope                            | float64     | 1         | 1.0                                                                                                                                           |
| band_name                        | String      | 1         | "none"                                                                                                                                        |
| long_name                        | String      | 1         | "Receiver clock bias rate"                                                                                                                    |
| units                            | String      | 1         | "m/s"                                                                                                                                         |
| valid_range                      | float64     | 2         | -100.0, 100.0                                                                                                                                 |
| Description                      | String      | 1         | "The receiver clock bias rate (in                                                                                                             |

|             |                                                 |           |
|-------------|-------------------------------------------------|-----------|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |
|             | 所属主题: L1 数据产品                                   | 页码: 13/38 |

|                         |             |           |                                                                                                                  |
|-------------------------|-------------|-----------|------------------------------------------------------------------------------------------------------------------|
|                         |             |           | seconds/second) multiplied by the speed of light as reported by the DDMI, interpolated to ddm_time_utc, in m/s.” |
| <b>SDS8. SDS 名称</b>     | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                   |
| Rx_pos_x<br>低轨卫星位置 X 分量 | float64     | [nscans]  | nscans*8                                                                                                         |
| <b>SDS 属性名</b>          | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                         |
| FillValue               | float64     | 1         | -9999999.9                                                                                                       |
| Intercept               | float64     | 1         | 0.0                                                                                                              |
| Slope                   | float64     | 1         | 1.0                                                                                                              |
| band_name               | String      | 1         | “none”                                                                                                           |
| long_name               | String      | 1         | “Spacecraft position X at DDM sample time”                                                                       |
| units                   | String      | 1         | “m”                                                                                                              |
| valid_range             | float64     | 2         | -7500000.0,7500000.0                                                                                             |
| Description             | String      | 1         | “The X component of the spacecraft WGS84 reference frame ECEF position, in meters, at ddm_time_utc.”             |
| <b>SDS9. SDS 名称</b>     | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                   |
| Rx_pos_y<br>低轨卫星位置 Y 分量 | float64     | [nscans]  | nscans*8                                                                                                         |
| <b>SDS 属性名</b>          | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                         |
| FillValue               | float64     | 1         | -9999999.9                                                                                                       |
| Intercept               | float64     | 1         | 0.0                                                                                                              |
| Slope                   | float64     | 1         | 1.0                                                                                                              |
| band_name               | String      | 1         | “none”                                                                                                           |
| long_name               | String      | 1         | “Spacecraft position Y at DDM sample time”                                                                       |
| units                   | String      | 1         | “m”                                                                                                              |
| valid_range             | float64     | 2         | -7500000.0,7500000.0                                                                                             |
| Description             | String      | 1         | “The Y component of the spacecraft WGS84 reference frame ECEF position, in meters, at ddm_time_utc.”             |
| <b>SDS10. SDS 名称</b>    | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                   |
| Rx_pos_z<br>低轨卫星位置 Z 分量 | float64     | [nscans]  | nscans*8                                                                                                         |
| <b>SDS 属性名</b>          | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                         |
| FillValue               | float64     | 1         | -9999999.9                                                                                                       |
| Intercept               | float64     | 1         | 0.0                                                                                                              |
| Slope                   | float64     | 1         | 1.0                                                                                                              |
| band_name               | String      | 1         | “none”                                                                                                           |
| long_name               | String      | 1         | “Spacecraft position Z at DDM sample time”                                                                       |
| units                   | String      | 1         | “m”                                                                                                              |
| valid_range             | float64     | 2         | -7500000.0,7500000.0                                                                                             |
| Description             | String      | 1         | “The Z component of the spacecraft WGS84 reference frame ECEF position, in meters, at ddm_time_utc.”             |

|             |                                                                 |           |
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| FY3 数据产品特性卡 | 文件名: <a href="#">L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射)</a> |           |
|             | 特性集名称: <a href="#">FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</a>           |           |
|             | 所属主题: <a href="#">L1 数据产品</a>                                   | 页码: 14/38 |

| SDS11. SDS 名称           | 数据类型        | 维数        | 数据量(字节)                                                                                          |
|-------------------------|-------------|-----------|--------------------------------------------------------------------------------------------------|
| Rx_vel_x<br>低轨卫星速度 X 分量 | float64     | [nscans]  | nscans*8                                                                                         |
| <b>SDS 属性名</b>          | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                         |
| FillValue               | float64     | 1         | -9999.9                                                                                          |
| Intercept               | float64     | 1         | 0.0                                                                                              |
| Slope                   | float64     | 1         | 1.0                                                                                              |
| band_name               | String      | 1         | "none"                                                                                           |
| long_name               | String      | 1         | "Spacecraft velocity X at DDM sample time"                                                       |
| units                   | String      | 1         | "m/s"                                                                                            |
| valid_range             | float64     | 2         | -8000.0,8000.0                                                                                   |
| Description             | String      | 1         | "The X component of the spacecraft WGS84 reference frame ECEF velocity, in m/s, at ddm_time_utc" |
| SDS12. SDS 名称           | 数据类型        | 维数        | 数据量(字节)                                                                                          |
| Rx_vel_y<br>低轨卫星速度 Y 分量 | float64     | [nscans]  | nscans*8                                                                                         |
| <b>SDS 属性名</b>          | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                         |
| FillValue               | float64     | 1         | -9999.9                                                                                          |
| Intercept               | float64     | 1         | 0.0                                                                                              |
| Slope                   | float64     | 1         | 1.0                                                                                              |
| band_name               | String      | 1         | "none"                                                                                           |
| long_name               | String      | 1         | "Spacecraft velocity Y at DDM sample time"                                                       |
| units                   | String      | 1         | "m/s"                                                                                            |
| valid_range             | float64     | 2         | -8000.0,8000.0                                                                                   |
| Description             | String      | 1         | "The Y component of the spacecraft WGS84 reference frame ECEF velocity, in m/s, at ddm_time_utc" |
| SDS13. SDS 名称           | 数据类型        | 维数        | 数据量(字节)                                                                                          |
| Rx_vel_z<br>低轨卫星速度 Z 分量 | float64     | [nscans]  | nscans*8                                                                                         |
| <b>SDS 属性名</b>          | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                         |
| FillValue               | float64     | 1         | -9999.9                                                                                          |
| Intercept               | float64     | 1         | 0.0                                                                                              |
| Slope                   | float64     | 1         | 1.0                                                                                              |
| band_name               | String      | 1         | "none"                                                                                           |
| long_name               | String      | 1         | "Spacecraft velocity Z at DDM sample time"                                                       |
| units                   | String      | 1         | "m/s"                                                                                            |
| valid_range             | float64     | 2         | -8000.0,8000.0                                                                                   |
| Description             | String      | 1         | "The Z component of the spacecraft WGS84 reference frame ECEF velocity, in m/s, at ddm_time_utc" |
| SDS14. SDS 名称           | 数据类型        | 维数        | 数据量(字节)                                                                                          |
| Rx_lon<br>低轨卫星的经度       | float64     | [nscans]  | nscans*8                                                                                         |
| <b>SDS 属性名</b>          | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                         |
| FillValue               | float64     | 1         | -9999.9                                                                                          |
| Intercept               | float64     | 1         | 0.0                                                                                              |

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| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |  |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |  |
|             | 所属主题: L1 数据产品                                   | 页码: 15/38 |  |

|                                |             |           |                                                                          |
|--------------------------------|-------------|-----------|--------------------------------------------------------------------------|
| Slope                          | float64     | 1         | 1.0                                                                      |
| band_name                      | String      | 1         | "none"                                                                   |
| long_name                      | String      | 1         | "Sub-satellite point longitude"                                          |
| units                          | String      | 1         | "degree"                                                                 |
| valid_range                    | float64     | 2         | 0.0, 360.0                                                               |
| Description                    | String      | 1         | "Subsatellite point longitude, in degrees East, at ddm_time_utc"         |
| <b>SDS 15. SDS 名称</b>          | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                           |
| Rx_lat<br>低轨卫星的纬度              | float64     | [nscans]  | nscans*8                                                                 |
| <b>SDS 属性名</b>                 | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                 |
| FillValue                      | float64     | 1         | -9999.9                                                                  |
| Intercept                      | float64     | 1         | 0.0                                                                      |
| Slope                          | float64     | 1         | 1.0                                                                      |
| band_name                      | String      | 1         | "none"                                                                   |
| long_name                      | String      | 1         | "Sub-satellite point latitude"                                           |
| units                          | String      | 1         | "degree"                                                                 |
| valid_range                    | float64     | 2         | -90.0, 90.0                                                              |
| Description                    | String      | 1         | "Subsatellite point latitude, in degrees North, at ddm_time_utc"         |
| <b>SDS16. SDS 名称</b>           | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                           |
| Rx_alt<br>低轨卫星的高度              | float64     | [nscans]  | nscans*8                                                                 |
| <b>SDS 属性名</b>                 | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                 |
| FillValue                      | float64     | 1         | -9999.9                                                                  |
| Intercept                      | float64     | 1         | 0.0                                                                      |
| Slope                          | float64     | 1         | 1.0                                                                      |
| band_name                      | String      | 1         | "none"                                                                   |
| long_name                      | String      | 1         | "Spacecraft altitude"                                                    |
| units                          | String      | 1         | "m"                                                                      |
| valid_range                    | float64     | 2         | 0.0, 1000000.0                                                           |
| Description                    | String      | 1         | "Spacecraft altitude above WGS-84 ellipsoid, in meters, at ddm_time_utc" |
| <b>SDS17. SDS 名称</b>           | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                           |
| Rx_attitude_status<br>低轨卫星姿态状态 | Int32       | [nscans]  | nscans*4                                                                 |
| <b>SDS 属性名</b>                 | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                 |
| FillValue                      | int32       | 1         | -2147483648                                                              |
| Intercept                      | float32     | 1         | 0.0                                                                      |
| Slope                          | float32     | 1         | 1.0                                                                      |
| band_name                      | String      | 1         | "none"                                                                   |
| long_name                      | String      | 1         | "Spacecraft attitude status"                                             |
| units                          | String      | 1         | "none"                                                                   |
| valid_range                    | int32       | 2         | 0,100000                                                                 |
| Description                    | String      | 1         | "The spacecraft tracker attitude status. 0 by default. "                 |
| <b>SDS18. SDS 名称</b>           | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                           |
| Rx_fly_direction<br>低轨卫星飞行方向   | Int32       | [nscans]  | nscans*4                                                                 |
| <b>SDS 属性名</b>                 | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                 |

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|-------------|-------------------------------------------------|-----------|--|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |  |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |  |
|             | 所属主题: L1 数据产品                                   | 页码: 16/38 |  |

|                      |             |           |                                                                                                            |
|----------------------|-------------|-----------|------------------------------------------------------------------------------------------------------------|
| FillValue            | int32       | 1         | -2147483648                                                                                                |
| Intercept            | float32     | 1         | 0.0                                                                                                        |
| Slope                | float32     | 1         | 1.0                                                                                                        |
| band_name            | String      | 1         | "none"                                                                                                     |
| long_name            | String      | 1         | "Spacecraft fly direction"                                                                                 |
| units                | String      | 1         | "none"                                                                                                     |
| valid_range          | int32       | 2         | 0, 10000                                                                                                   |
| Description          | String      | 1         | "Spacecraft fly direction.0: With the head forward;4369: With the head backward;8738:Unknow fly direction" |
| <b>SDS19. SDS 名称</b> | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                             |
| Rx_pitch<br>低轨卫星俯仰角  | float64     | [nscans]  | nscans*8                                                                                                   |
| <b>SDS 属性名</b>       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                   |
| FillValue            | float64     | 1         | -9999.9                                                                                                    |
| Intercept            | float64     | 1         | 0.0                                                                                                        |
| Slope                | float64     | 1         | 1.0                                                                                                        |
| band_name            | String      | 1         | "none"                                                                                                     |
| long_name            | String      | 1         | "Spacecraft attitude pitch angle at DDM sample time"                                                       |
| units                | String      | 1         | "degree"                                                                                                   |
| valid_range          | float64     | 2         | -360.0,360.0                                                                                               |
| Description          | String      | 1         | "Spacecraft pitch angle relative to the orbit frame, in radians at ddm_time_utc"                           |
| <b>SDS20. SDS 名称</b> | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                             |
| Rx_yaw<br>低轨卫星偏航角    | float64     | [nscans]  | nscans*8                                                                                                   |
| <b>SDS 属性名</b>       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                   |
| FillValue            | float64     | 1         | -9999.9                                                                                                    |
| Intercept            | float64     | 1         | 0.0                                                                                                        |
| Slope                | float64     | 1         | 1.0                                                                                                        |
| band_name            | String      | 1         | "none"                                                                                                     |
| long_name            | String      | 1         | "Spacecraft attitude yaw angle at DDM sample time"                                                         |
| units                | String      | 1         | "degree"                                                                                                   |
| valid_range          | float64     | 2         | -360.0,360.0                                                                                               |
| Description          | String      | 1         | "Spacecraft yaw angle relative to the orbit frame, in radians at ddm_time_utc"                             |
| <b>SDS21. SDS 名称</b> | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                             |
| Rx_roll<br>低轨卫星翻滚角   | float64     | [nscans]  | nscans*8                                                                                                   |
| <b>SDS 属性名</b>       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                   |
| FillValue            | float64     | 1         | -9999.9                                                                                                    |
| Intercept            | float64     | 1         | 0.0                                                                                                        |
| Slope                | float64     | 1         | 1.0                                                                                                        |
| band_name            | String      | 1         | "none"                                                                                                     |
| long_name            | String      | 1         | "Spacecraft attitude roll angle at DDM sample time"                                                        |



|             |                                                 |           |
|-------------|-------------------------------------------------|-----------|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |
|             | 所属主题: L1 数据产品                                   | 页码: 17/38 |

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|--------------------------------|-------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| units                          | String      | 1         | "degree"                                                                                                                                                                                |
| valid_range                    | float64     | 2         | -360.0,360.0                                                                                                                                                                            |
| Description                    | String      | 1         | "Spacecraft roll angle relative to the orbit frame, in radians at ddm_time_utc"                                                                                                         |
| <b>SDS22. SDS 名称</b>           | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                          |
| Gnss_prn_code<br>GNSS 卫星 PRN 码 | int32       | [nscans]  | nscans*4                                                                                                                                                                                |
| <b>SDS 属性名</b>                 | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                |
| FillValue                      | int32       | 1         | -2147483648                                                                                                                                                                             |
| Intercept                      | float32     | 1         | 0.0                                                                                                                                                                                     |
| Slope                          | float32     | 1         | 1.0                                                                                                                                                                                     |
| band_name                      | String      | 1         | "none"                                                                                                                                                                                  |
| long_name                      | String      | 1         | "GNSS PRN code"                                                                                                                                                                         |
| units                          | String      | 1         | "none"                                                                                                                                                                                  |
| valid_range                    | int32       | 2         | 1, 1000                                                                                                                                                                                 |
| Description                    | String      | 1         | "The PRN code of the GNSS signal associated with the DDM."                                                                                                                              |
| <b>SDS23. SDS 名称</b>           | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                          |
| Gnss_svn_num<br>GNSS 卫星 SV 码   | int32       | [nscans]  | nscans*4                                                                                                                                                                                |
| <b>SDS 属性名</b>                 | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                |
| FillValue                      | int32       | 1         | -2147483648                                                                                                                                                                             |
| Intercept                      | float32     | 1         | 0.0                                                                                                                                                                                     |
| Slope                          | float32     | 1         | 1.0                                                                                                                                                                                     |
| band_name                      | String      | 1         | "none"                                                                                                                                                                                  |
| long_name                      | String      | 1         | "GNSS space vehicle number"                                                                                                                                                             |
| units                          | String      | 1         | "none"                                                                                                                                                                                  |
| valid_range                    | int32       | 2         | 1, 1000                                                                                                                                                                                 |
| Description                    | String      | 1         | "The GNSS unique space vehicle number that transmitted prn_code."                                                                                                                       |
| <b>SDS24. SDS 名称</b>           | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                          |
| Gnss_block_flag<br>GNSS 卫星批次代码 | int32       | [nscans]  | nscans*4                                                                                                                                                                                |
| <b>SDS 属性名</b>                 | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                |
| FillValue                      | int32       | 1         | -2147483648                                                                                                                                                                             |
| Intercept                      | float32     | 1         | 0.0                                                                                                                                                                                     |
| Slope                          | float32     | 1         | 1.0                                                                                                                                                                                     |
| band_name                      | String      | 1         | "none"                                                                                                                                                                                  |
| long_name                      | String      | 1         | "GNSS block code"                                                                                                                                                                       |
| units                          | String      | 1         | "none"                                                                                                                                                                                  |
| valid_range                    | int32       | 2         | 1,1000                                                                                                                                                                                  |
| Description                    | String      | 1         | "GNSS_block_flag is used to indicate the block or type for a certain GNSS satellite.<br>For GPS satellite:<br>22 = II-R<br>23 = IIR-M<br>24 = II-F<br>31 = III-A.<br>For BDS satellite: |

|                    |                                                                 |                  |
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| <b>FY3 数据产品特性卡</b> | 文件名: <a href="#">L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射)</a> |                  |
|                    | 特性集名称: <a href="#">FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</a>           |                  |
|                    | 所属主题: <a href="#">L1 数据产品</a>                                   | 页码: <b>18/38</b> |

|                                      |             |           |                                                                                                                                                                                                                                                                             |
|--------------------------------------|-------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                      |             |           | the First number indicates the type of system:<br>1 = BD-3S<br>2 = BD-2<br>3 = BD-3<br>The second number indicates the type of orbit:<br>1 = GEO<br>2 = IGSO<br>3 = MEO.<br>For GAL satellite:<br>10 = IOV (In-Orbit Validation)<br>20 = FOC (Full Operational Capability)” |
| <b>SDS25. SDS 名称</b>                 | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                              |
| Tx_pos_x<br>GNSS 信号发射时刻的卫星位置<br>X 分量 | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                    |
| <b>SDS 属性名</b>                       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                    |
| FillValue                            | float64     | 1         | -99999999.9                                                                                                                                                                                                                                                                 |
| Intercept                            | float64     | 1         | 0.0                                                                                                                                                                                                                                                                         |
| Slope                                | float64     | 1         | 1.0                                                                                                                                                                                                                                                                         |
| band_name                            | String      | 1         | “none”                                                                                                                                                                                                                                                                      |
| long_name                            | String      | 1         | “GNSS Tx position X”                                                                                                                                                                                                                                                        |
| units                                | String      | 1         | “m”                                                                                                                                                                                                                                                                         |
| valid_range                          | float64     | 2         | -40000000.0,40000000.0                                                                                                                                                                                                                                                      |
| Description                          | String      | 1         | “The X component of the GNSS spacecraft WGS84 reference frame ECEF position, in meters, at sending time.”                                                                                                                                                                   |
| <b>SDS26. SDS 名称</b>                 | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                              |
| Tx_pos_y<br>GNSS 信号发射时刻的卫星位置<br>Y 分量 | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                    |
| <b>SDS 属性名</b>                       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                    |
| FillValue                            | float64     | 1         | -99999999.9                                                                                                                                                                                                                                                                 |
| Intercept                            | float64     | 1         | 0.0                                                                                                                                                                                                                                                                         |
| Slope                                | float64     | 1         | 1.0                                                                                                                                                                                                                                                                         |
| band_name                            | String      | 1         | “none”                                                                                                                                                                                                                                                                      |
| long_name                            | String      | 1         | “GNSS Tx position Y”                                                                                                                                                                                                                                                        |
| units                                | String      | 1         | “m”                                                                                                                                                                                                                                                                         |
| valid_range                          | float64     | 2         | -40000000.0,40000000.0                                                                                                                                                                                                                                                      |
| Description                          | String      | 1         | “The Y component of the GNSS spacecraft WGS84 reference frame ECEF position, in meters, at sending time.”                                                                                                                                                                   |
| <b>SDS27. SDS 名称</b>                 | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                              |
| Tx_pos_z<br>GNSS 信号发射时刻的卫星位置<br>Z 分量 | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                    |
| <b>SDS 属性名</b>                       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                    |

|             |                                                 |           |  |
|-------------|-------------------------------------------------|-----------|--|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |  |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |  |
|             | 所属主题: L1 数据产品                                   | 页码: 19/38 |  |

|                                      |             |           |                                                                                                           |
|--------------------------------------|-------------|-----------|-----------------------------------------------------------------------------------------------------------|
| FillValue                            | float64     | 1         | -99999999.9                                                                                               |
| Intercept                            | float64     | 1         | 0.0                                                                                                       |
| Slope                                | float64     | 1         | 1.0                                                                                                       |
| band_name                            | String      | 1         | “none”                                                                                                    |
| long_name                            | String      | 1         | “GNSS Tx position Z”                                                                                      |
| units                                | String      | 1         | “m”                                                                                                       |
| valid_range                          | float64     | 2         | -40000000.0,40000000.0                                                                                    |
| Description                          | String      | 1         | “The Z component of the GNSS spacecraft WGS84 reference frame ECEF position, in meters, at sending time.” |
| <b>SDS28. SDS 名称</b>                 | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                            |
| Tx_vel_x<br>GNSS 信号发射时刻的卫星速度<br>X 分量 | float64     | [nscans]  | nscans*8                                                                                                  |
| <b>SDS 属性名</b>                       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                  |
| FillValue                            | float64     | 1         | -9999.9                                                                                                   |
| Intercept                            | float64     | 1         | 0.0                                                                                                       |
| Slope                                | float64     | 1         | 1.0                                                                                                       |
| band_name                            | String      | 1         | “none”                                                                                                    |
| long_name                            | String      | 1         | “GNSS Tx velocity X”                                                                                      |
| units                                | String      | 1         | “m/s”                                                                                                     |
| valid_range                          | float64     | 2         | -5000.0,5000.0                                                                                            |
| Description                          | String      | 1         | “The X component of the GNSS spacecraft WGS84 reference frame ECEF velocity in meters, at sending time.”  |
| <b>SDS29. SDS 名称</b>                 | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                            |
| Tx_vel_y<br>GNSS 信号发射时刻的卫星速度<br>Y 分量 | float64     | [nscans]  | nscans*8                                                                                                  |
| <b>SDS 属性名</b>                       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                  |
| FillValue                            | float64     | 1         | -9999.9                                                                                                   |
| Intercept                            | float64     | 1         | 0.0                                                                                                       |
| Slope                                | float64     | 1         | 1.0                                                                                                       |
| band_name                            | String      | 1         | “none”                                                                                                    |
| long_name                            | String      | 1         | “GNSS Tx velocity Y”                                                                                      |
| units                                | String      | 1         | “m/s”                                                                                                     |
| valid_range                          | float64     | 2         | -5000.0,5000.0                                                                                            |
| Description                          | String      | 1         | “The Y component of the GNSS spacecraft WGS84 reference frame ECEF velocity in meters, at sending time.”  |
| <b>SDS30. SDS 名称</b>                 | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                            |
| Tx_vel_z<br>GNSS 信号发射时刻的卫星速度<br>Z 分量 | float64     | [nscans]  | nscans*8                                                                                                  |
| <b>SDS 属性名</b>                       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                  |
| FillValue                            | float64     | 1         | -9999.9                                                                                                   |
| Intercept                            | float64     | 1         | 0.0                                                                                                       |
| Slope                                | float64     | 1         | 1.0                                                                                                       |

|             |                                                                 |           |  |
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| FY3 数据产品特性卡 | 文件名: <a href="#">L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射)</a> |           |  |
|             | 特性集名称: <a href="#">FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</a>           |           |  |
|             | 所属主题: <a href="#">L1 数据产品</a>                                   | 页码: 20/38 |  |

|                      |             |           |                                                                                                                            |
|----------------------|-------------|-----------|----------------------------------------------------------------------------------------------------------------------------|
| band_name            | String      | 1         | “none”                                                                                                                     |
| long_name            | String      | 1         | “GNSS Tx velocity Z”                                                                                                       |
| units                | String      | 1         | “m/s”                                                                                                                      |
| valid_range          | float64     | 2         | -5000.0,5000.0                                                                                                             |
| Description          | String      | 1         | “The Z component of the GNSS spacecraft WGS84 reference frame ECEF velocity in meters, at sending time.”                   |
| <b>SDS31. SDS 名称</b> | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                             |
| Sp_lat<br>镜面反射点的纬度   | float64     | [nscans]  | nscans*8                                                                                                                   |
| <b>SDS 属性名</b>       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                   |
| FillValue            | float64     | 1         | -9999.9                                                                                                                    |
| Intercept            | float64     | 1         | 0.0                                                                                                                        |
| Slope                | float64     | 1         | 1.0                                                                                                                        |
| band_name            | String      | 1         | “none”                                                                                                                     |
| long_name            | String      | 1         | “Specular point latitude”                                                                                                  |
| units                | String      | 1         | “degree”                                                                                                                   |
| valid_range          | float64     | 2         | -90.0,90.0                                                                                                                 |
| Description          | String      | 1         | “Specular point latitude, in degrees North corresponding to ddm_time_utc.”                                                 |
| <b>SDS32. SDS 名称</b> | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                             |
| Sp_lon<br>镜面反射点的经度   | Float64     | [nscans]  | nscans*8                                                                                                                   |
| <b>SDS 属性名</b>       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                   |
| FillValue            | float64     | 1         | -9999.9                                                                                                                    |
| Intercept            | float64     | 1         | “none”                                                                                                                     |
| Slope                | float64     | 1         | “none”                                                                                                                     |
| band_name            | String      | 1         | “none”                                                                                                                     |
| long_name            | String      | 1         | “Specular point longitude”                                                                                                 |
| units                | String      | 1         | “degree”                                                                                                                   |
| valid_range          | float64     | 2         | 0.0,360.0                                                                                                                  |
| Description          | String      | 1         | “Specular point longitude, in degrees North corresponding to ddm_time_utc.”                                                |
| <b>SDS33. SDS 名称</b> | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                             |
| Sp_alt<br>镜面反射点的高度   | float64     | [nscans]  | nscans*8                                                                                                                   |
| <b>SDS 属性名</b>       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                   |
| FillValue            | float64     | 1         | -9999.9                                                                                                                    |
| Intercept            | float64     | 1         | 0.0                                                                                                                        |
| Slope                | float64     | 1         | 1.0                                                                                                                        |
| band_name            | String      | 1         | “none”                                                                                                                     |
| long_name            | String      | 1         | “Specular point altitude”                                                                                                  |
| units                | String      | 1         | “m”                                                                                                                        |
| valid_range          | float64     | 2         | -9000.0,9000.0                                                                                                             |
| Description          | String      | 1         | “Altitude of the specular point relative to the WGS 84 datum in meters corresponding to ddm_time_utc, as calculated on the |

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| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |
|             | 所属主题: L1 数据产品                                   | 页码: 21/38 |

|                           |             |           |                                                                                                                                                       |
|---------------------------|-------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           |             |           | ground. Note that an approximated DTU10 mean sea surface height model is used to calculate the specular point altitude.”                              |
| <b>SDS34. SDS 名称</b>      | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                        |
| Sp_pos_x<br>镜面反射点位置的 X 分量 | float64     | [nscans]  | nscans*8                                                                                                                                              |
| <b>SDS 属性名</b>            | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                              |
| FillValue                 | float64     | 1         | -99999999.9                                                                                                                                           |
| Intercept                 | float64     | 1         | “none”                                                                                                                                                |
| Slope                     | float64     | 1         | “none”                                                                                                                                                |
| band_name                 | String      | 1         | “none”                                                                                                                                                |
| long_name                 | String      | 1         | “Specular point position X”                                                                                                                           |
| units                     | String      | 1         | “m”                                                                                                                                                   |
| valid_range               | float64     | 2         | -7000000.0,7000000.0                                                                                                                                  |
| Description               | String      | 1         | “The X component of the specular point position in the ECEF coordinate system, in meters corresponding to ddm_time_utc, as calculated on the ground.” |
| <b>SDS35. SDS 名称</b>      | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                        |
| Sp_pos_y<br>镜面反射点位置的 Y 分量 | float64     | [nscans]  | nscans*8                                                                                                                                              |
| <b>SDS 属性名</b>            | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                              |
| FillValue                 | float64     | 1         | -99999999.9                                                                                                                                           |
| Intercept                 | float64     | 1         | 0.0                                                                                                                                                   |
| Slope                     | float64     | 1         | 1.0                                                                                                                                                   |
| band_name                 | String      | 1         | “none”                                                                                                                                                |
| long_name                 | String      | 1         | “Specular point position Y”                                                                                                                           |
| units                     | String      | 1         | “m”                                                                                                                                                   |
| valid_range               | float64     | 2         | -7000000.0,7000000.0                                                                                                                                  |
| Description               | String      | 1         | “The Y component of the specular point position in the ECEF coordinate system, in meters corresponding to ddm_time_utc, as calculated on the ground.” |
| <b>SDS36. SDS 名称</b>      | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                        |
| Sp_pos_z<br>镜面反射点位置的 Z 分量 | float64     | [nscans]  | nscans*8                                                                                                                                              |
| <b>SDS 属性名</b>            | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                              |
| FillValue                 | float64     | 1         | -99999999.9                                                                                                                                           |
| Intercept                 | float64     | 1         | 0.0                                                                                                                                                   |
| Slope                     | float64     | 1         | 1.0                                                                                                                                                   |
| band_name                 | String      | 1         | “none”                                                                                                                                                |
| long_name                 | String      | 1         | “Specular point position Z”                                                                                                                           |
| units                     | String      | 1         | “m”                                                                                                                                                   |
| valid_range               | float64     | 2         | -7000000.0,7000000.0                                                                                                                                  |
| Description               | String      | 1         | “The Z component of the specular point position in the ECEF coordinate system, in meters corresponding to ddm_time_utc, as calculated on the ground.” |

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| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |
|             | 所属主题: L1 数据产品                                   | 页码: 22/38 |

| SDS37. SDS 名称                    | 数据类型        | 维数        | 数据量(字节)                                                                                                                                            |
|----------------------------------|-------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Sp_vel_x<br>镜面反射点速度的 X 分量        | float64     | [nscans]  | nscans*8                                                                                                                                           |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                           |
| FillValue                        | float64     | 1         | -9999.9                                                                                                                                            |
| Intercept                        | float64     | 1         | "none"                                                                                                                                             |
| Slope                            | float64     | 1         | "none"                                                                                                                                             |
| band_name                        | String      | 1         | "none"                                                                                                                                             |
| long_name                        | String      | 1         | "Specular point velocity X"                                                                                                                        |
| units                            | String      | 1         | "m/s"                                                                                                                                              |
| valid_range                      | float64     | 2         | -8000.0,8000.0                                                                                                                                     |
| Description                      | String      | 1         | "The X component of the specular point velocity in the ECEF coordinate system, in m/s corresponding to ddm_time_utc, as calculated on the ground." |
| SDS38. SDS 名称                    | 数据类型        | 维数        | 数据量(字节)                                                                                                                                            |
| Sp_vel_y<br>镜面反射点速度的 Y 分量        | float64     | [nscans]  | nscans*8                                                                                                                                           |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                           |
| FillValue                        | float64     | 1         | -9999.9                                                                                                                                            |
| Intercept                        | float64     | 1         | 0.0                                                                                                                                                |
| Slope                            | float64     | 1         | 1.0                                                                                                                                                |
| band_name                        | String      | 1         | "none"                                                                                                                                             |
| long_name                        | String      | 1         | "Specular point velocity Y"                                                                                                                        |
| units                            | String      | 1         | "m/s"                                                                                                                                              |
| valid_range                      | float64     | 2         | -8000.0,8000.0                                                                                                                                     |
| Description                      | String      | 1         | "The Y component of the specular point velocity in the ECEF coordinate system, in m/s corresponding to ddm_time_utc, as calculated on the ground." |
| SDS39. SDS 名称                    | 数据类型        | 维数        | 数据量(字节)                                                                                                                                            |
| Sp_vel_z<br>镜面反射点速度的 Z 分量        | float64     | [nscans]  | nscans*8                                                                                                                                           |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                           |
| FillValue                        | float64     | 1         | -9999.9                                                                                                                                            |
| Intercept                        | float64     | 1         | 0.0                                                                                                                                                |
| Slope                            | float64     | 1         | 1.0                                                                                                                                                |
| band_name                        | String      | 1         | "none"                                                                                                                                             |
| long_name                        | String      | 1         | "Specular point velocity Z"                                                                                                                        |
| units                            | String      | 1         | "m/s"                                                                                                                                              |
| valid_range                      | float64     | 2         | -8000.0,8000.0                                                                                                                                     |
| Description                      | String      | 1         | "The Z component of the specular point velocity in the ECEF coordinate system, in m/s corresponding to ddm_time_utc, as calculated on the ground." |
| SDS40. SDS 名称                    | 数据类型        | 维数        | 数据量(字节)                                                                                                                                            |
| Sp_inc_angle<br>镜面反射点处 GNSS 信号入射 | float64     | [nscans]  | nscans*8                                                                                                                                           |

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| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |
|             | 所属主题: L1 数据产品                                   | 页码: 23/38 |

| 角                               |         |          |                                                                                                                                                                                                                                                               |
|---------------------------------|---------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SDS 属性名                         | 数据类型    | 数量       | 值                                                                                                                                                                                                                                                             |
| FillValue                       | float64 | 1        | -9999.9                                                                                                                                                                                                                                                       |
| Intercept                       | float64 | 1        | 0.0                                                                                                                                                                                                                                                           |
| Slope                           | float64 | 1        | 1.0                                                                                                                                                                                                                                                           |
| band_name                       | String  | 1        | "none"                                                                                                                                                                                                                                                        |
| long_name                       | String  | 1        | "Specular point incidence angle"                                                                                                                                                                                                                              |
| units                           | String  | 1        | "degree"                                                                                                                                                                                                                                                      |
| valid_range                     | float64 | 2        | 0.0,90.0                                                                                                                                                                                                                                                      |
| Description                     | String  | 1        | "The specular point incidence angle, in degrees corresponding to ddm_time_utc. This is the angle between the line normal to the Earth's surface at the specular point and the line extending from the specular point to the spacecraft."                      |
| SDS41. SDS 名称                   | 数据类型    | 维数       | 数据量(字节)                                                                                                                                                                                                                                                       |
| Sp_theta_orbit<br>镜面反射点轨道坐标系高度角 | float64 | [nscans] | nscans*8                                                                                                                                                                                                                                                      |
| SDS 属性名                         | 数据类型    | 数量       | 值                                                                                                                                                                                                                                                             |
| FillValue                       | float64 | 1        | -9999.9                                                                                                                                                                                                                                                       |
| Intercept                       | float64 | 1        | 0.0                                                                                                                                                                                                                                                           |
| Slope                           | float64 | 1        | 1.0                                                                                                                                                                                                                                                           |
| band_name                       | String  | 1        | "none"                                                                                                                                                                                                                                                        |
| long_name                       | String  | 1        | "Specular point orbit frame theta angle"                                                                                                                                                                                                                      |
| units                           | String  | 1        | "degree"                                                                                                                                                                                                                                                      |
| valid_range                     | float64 | 2        | 0.0,90.0                                                                                                                                                                                                                                                      |
| Description                     | String  | 1        | "The angle between the orbit frame +Z axis and the line extending from the spacecraft to the specular point, in degrees."                                                                                                                                     |
| SDS42. SDS 名称                   | 数据类型    | 维数       | 数据量(字节)                                                                                                                                                                                                                                                       |
| Sp_az_orbit<br>镜面反射点轨道坐标系方位角    | float64 | [nscans] | nscans*8                                                                                                                                                                                                                                                      |
| SDS 属性名                         | 数据类型    | 数量       | 值                                                                                                                                                                                                                                                             |
| FillValue                       | float64 | 1        | -9999.9                                                                                                                                                                                                                                                       |
| Intercept                       | float64 | 1        | 0.0                                                                                                                                                                                                                                                           |
| Slope                           | float64 | 1        | 1.0                                                                                                                                                                                                                                                           |
| band_name                       | String  | 1        | "none"                                                                                                                                                                                                                                                        |
| long_name                       | String  | 1        | "Specular point orbit frame azimuth angle"                                                                                                                                                                                                                    |
| units                           | String  | 1        | "degree"                                                                                                                                                                                                                                                      |
| valid_range                     | float64 | 2        | 0.0, 360.0                                                                                                                                                                                                                                                    |
| Description                     | String  | 1        | "Let line A be the line that extends from the spacecraft to the specular point. Let line B be the projection of line A onto the orbit frame XY plane. sp_az_orbit is the angle between the orbit frame +X axis (the velocity vector) and line B, in degrees." |

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| FY3 数据产品特性卡 | 文件名: <a href="#">L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射)</a> |                  |
|             | 特性集名称: <a href="#">FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</a>           |                  |
|             | 所属主题: <a href="#">L1 数据产品</a>                                   | 页码: <b>24/38</b> |

| SDS 43. SDS 名称                       | 数据类型        | 维数        | 数据量(字节)                                                                                                                                                                                                                                                    |
|--------------------------------------|-------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sp_theta_body<br>镜面反射点卫星坐标系中高度角      | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                   |
| <b>SDS 属性名</b>                       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                   |
| FillValue                            | float64     | 1         | -9999.9                                                                                                                                                                                                                                                    |
| Intercept                            | float64     | 1         | 0.0                                                                                                                                                                                                                                                        |
| Slope                                | float64     | 1         | 1.0                                                                                                                                                                                                                                                        |
| band_name                            | String      | 1         | "none"                                                                                                                                                                                                                                                     |
| long_name                            | String      | 1         | "Specular point body frame theta angle"                                                                                                                                                                                                                    |
| units                                | string      | 1         | "degree"                                                                                                                                                                                                                                                   |
| valid_range                          | float64     | 2         | 0.0,90.0                                                                                                                                                                                                                                                   |
| Description                          | String      | 1         | "The angle between the spacecraft body frame +Z axis and the line extending from the spacecraft to the specular point, in degrees."                                                                                                                        |
| SDS44. SDS 名称                        | 数据类型        | 维数        | 数据量(字节)                                                                                                                                                                                                                                                    |
| Sp_az_body<br>镜面反射点卫星坐标系方位角          | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                   |
| <b>SDS 属性名</b>                       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                   |
| FillValue                            | float64     | 1         | -9999.9                                                                                                                                                                                                                                                    |
| Intercept                            | float64     | 1         | 0.0                                                                                                                                                                                                                                                        |
| Slope                                | float64     | 1         | 1.0                                                                                                                                                                                                                                                        |
| band_name                            | String      | 1         | "none"                                                                                                                                                                                                                                                     |
| long_name                            | String      | 1         | "Specular point body frame azimuth angle"                                                                                                                                                                                                                  |
| units                                | String      | 1         | "degree"                                                                                                                                                                                                                                                   |
| valid_range                          | float64     | 2         | 0.0,360.0                                                                                                                                                                                                                                                  |
| Description                          | String      | 1         | "Let line A be the line that extends from the spacecraft to the specular point. Let line B be the projection of line A onto the spacecraft body frame XY plane. sp_az_body is the angle between the spacecraft body frame +X axis and line B, in degrees." |
| SDS45. SDS 名称                        | 数据类型        | 维数        | 数据量(字节)                                                                                                                                                                                                                                                    |
| Sp_theta_antenna<br>镜面反射点在天线坐标系中的高度角 | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                   |
| <b>SDS 属性名</b>                       | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                   |
| FillValue                            | float64     | 1         | -9999.9                                                                                                                                                                                                                                                    |
| Intercept                            | float64     | 1         | 0.0                                                                                                                                                                                                                                                        |
| Slope                                | float64     | 1         | 1.0                                                                                                                                                                                                                                                        |
| band_name                            | String      | 1         | "none"                                                                                                                                                                                                                                                     |
| long_name                            | String      | 1         | "Specular point antenna frame theta angle"                                                                                                                                                                                                                 |
| units                                | String      | 1         | "degree"                                                                                                                                                                                                                                                   |
| valid_range                          | float64     | 2         | 0.0,90.0                                                                                                                                                                                                                                                   |
| Description                          | String      | 1         | "The angle between the spacecraft                                                                                                                                                                                                                          |



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| FY3 数据产品特性卡 | 文件名: <a href="#">L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射)</a> |           |
|             | 特性集名称: <a href="#">FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</a>           |           |
|             | 所属主题: <a href="#">L1 数据产品</a>                                   | 页码: 25/38 |

|                                       |             |           |                                                                                                                                                                                                                                                                  |
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|                                       |             |           | antenna frame +Z axis and the line extending from the spacecraft to the specular point, in degrees.”                                                                                                                                                             |
| <b>SDS46. SDS 名称</b>                  | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                   |
| Sp_az_antenna<br>镜面反射点在天线坐标系中的方位角     | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                         |
| <b>SDS 属性名</b>                        | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                         |
| FillValue                             | float64     | 1         | -9999.9                                                                                                                                                                                                                                                          |
| Intercept                             | float64     | 1         | 0.0                                                                                                                                                                                                                                                              |
| Slope                                 | float64     | 1         | 1.0                                                                                                                                                                                                                                                              |
| band_name                             | String      | 1         | “none”                                                                                                                                                                                                                                                           |
| long_name                             | String      | 1         | “Specular point antenna frame azimuth angle”                                                                                                                                                                                                                     |
| units                                 | String      | 1         | “degree”                                                                                                                                                                                                                                                         |
| valid_range                           | float64     | 2         | 0.0,360.0                                                                                                                                                                                                                                                        |
| Description                           | String      | 1         | “Let line A be the line that extends from the spacecraft to the specular point. Let line B be the projection of line A onto the spacecraft antenna frame XY plane. sp_az_body is the angle between the spacecraft antenna frame +X axis and line B, in degrees.” |
| <b>SDS47. SDS 名称</b>                  | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                   |
| Sp_theta_pattern<br>镜面反射点在方向图坐标系中的高度角 | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                         |
| <b>SDS 属性名</b>                        | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                         |
| FillValue                             | float64     | 1         | -9999.9                                                                                                                                                                                                                                                          |
| Intercept                             | float64     | 1         | 0.0                                                                                                                                                                                                                                                              |
| Slope                                 | float64     | 1         | 1.0                                                                                                                                                                                                                                                              |
| band_name                             | String      | 1         | “none”                                                                                                                                                                                                                                                           |
| long_name                             | String      | 1         | “Specular point antenna pattern frame theta angle”                                                                                                                                                                                                               |
| units                                 | String      | 1         | “degree”                                                                                                                                                                                                                                                         |
| valid_range                           | float64     | 2         | 0.0,90.0                                                                                                                                                                                                                                                         |
| Description                           | String      | 1         | “The angle between the spacecraft antenna pattern frame +Z axis and the line extending from the spacecraft to the specular point, in degrees.”                                                                                                                   |
| <b>SDS48. SDS 名称</b>                  | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                   |
| Sp_az_pattern<br>镜面反射点在方向图坐标系中的方位角    | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                         |
| <b>SDS 属性名</b>                        | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                         |
| FillValue                             | float64     | 1         | -9999.9                                                                                                                                                                                                                                                          |
| Intercept                             | float64     | 1         | 0.0                                                                                                                                                                                                                                                              |
| Slope                                 | float64     | 1         | 1.0                                                                                                                                                                                                                                                              |
| band_name                             | String      | 1         | “none”                                                                                                                                                                                                                                                           |

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| FY3 数据产品特性卡 | 文件名: <a href="#">L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射)</a> |                  |
|             | 特性集名称: <a href="#">FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</a>           |                  |
|             | 所属主题: <a href="#">L1 数据产品</a>                                   | 页码: <b>26/38</b> |

|                                              |             |           |                                                                                                                                                                                                                                                                          |
|----------------------------------------------|-------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| long_name                                    | String      | 1         | “Specular point antenna pattern frame azimuth angle”                                                                                                                                                                                                                     |
| units                                        | String      | 1         | “degree”                                                                                                                                                                                                                                                                 |
| valid_range                                  | float64     | 2         | 0.0,360.0                                                                                                                                                                                                                                                                |
| Description                                  | String      | 1         | “Let line A be the line that extends from the spacecraft to the specular point. Let line B be the projection of line A onto the spacecraft antenna pattern frame XY plane. sp_az_body is the angle between the spacecraft antenna frame +X axis and line B, in degrees.” |
| <b>SDS49. SDS 名称</b>                         | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                           |
| Sp_antenna_gain<br>镜面反射点接收机天线增益              | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                 |
| <b>SDS 属性名</b>                               | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                 |
| FillValue                                    | float64     | 1         | -9999.9                                                                                                                                                                                                                                                                  |
| Intercept                                    | float64     | 1         | 0.0                                                                                                                                                                                                                                                                      |
| Slope                                        | float64     | 1         | 1.0                                                                                                                                                                                                                                                                      |
| band_name                                    | String      | 1         | “none”                                                                                                                                                                                                                                                                   |
| long_name                                    | String      | 1         | “Specular point Rx antenna gain”                                                                                                                                                                                                                                         |
| units                                        | String      | 1         | “dB”                                                                                                                                                                                                                                                                     |
| valid_range                                  | float64     | 2         | -200.0,20.0                                                                                                                                                                                                                                                              |
| Description                                  | String      | 1         | “The receive antenna gain in the direction of the specular point, in dBi.”                                                                                                                                                                                               |
| <b>SDS50. SDS 名称</b>                         | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                           |
| Sp_surface_type<br>镜面反射点处地物类型                | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                 |
| <b>SDS 属性名</b>                               | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                 |
| FillValue                                    | float64     | 1         | -9999.9                                                                                                                                                                                                                                                                  |
| Intercept                                    | float64     | 1         | 0.0                                                                                                                                                                                                                                                                      |
| Slope                                        | float64     | 1         | 1.0                                                                                                                                                                                                                                                                      |
| band_name                                    | String      | 1         | “none”                                                                                                                                                                                                                                                                   |
| long_name                                    | String      | 1         | “Specular point surface type”                                                                                                                                                                                                                                            |
| units                                        | String      | 1         | “none”                                                                                                                                                                                                                                                                   |
| valid_range                                  | float64     | 2         | 0.0,1.0                                                                                                                                                                                                                                                                  |
| Description                                  | String      | 1         | “Land-sea mask:<br>0 = Sea or inland water;<br>1 = land;<br>0-1 means between land and sea or inland water”                                                                                                                                                              |
| <b>SDS51. SDS 名称</b>                         | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                           |
| Sp_fresnel_coeff_square<br>镜面反射点处菲涅尔反射系数模的平方 | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                 |
| <b>SDS 属性名</b>                               | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                 |
| FillValue                                    | float64     | 1         | -9999.9                                                                                                                                                                                                                                                                  |
| Intercept                                    | float64     | 1         | “none”                                                                                                                                                                                                                                                                   |
| Slope                                        | float64     | 1         | “none”                                                                                                                                                                                                                                                                   |
| band_name                                    | String      | 1         | “none”                                                                                                                                                                                                                                                                   |

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| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |
|             | 所属主题: L1 数据产品                                   | 页码: 27/38 |

|                                 |             |           |                                                                                                                                                                                          |
|---------------------------------|-------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| long_name                       | String      | 1         | “Square of Fresnel power reflection coefficient at specular point”                                                                                                                       |
| units                           | String      | 1         | “none”                                                                                                                                                                                   |
| valid_range                     | float64     | 2         | 0.0,1.0                                                                                                                                                                                  |
| Description                     | String      | 1         | “The square of the left hand circularly polarized Fresnel electromagnetic voltage reflection coefficient for a smooth ocean surface at the specular point location and incidence angle.” |
| <b>SDS52. SDS 名称</b>            | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                           |
| Rx_sp_range<br>接收机与镜面反射点间距离     | float64     | [nscans]  | nscans*8                                                                                                                                                                                 |
| <b>SDS 属性名</b>                  | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                 |
| FillValue                       | float64     | 1         | -9999.9                                                                                                                                                                                  |
| Intercept                       | float64     | 1         | 0.0                                                                                                                                                                                      |
| Slope                           | float64     | 1         | 1.0                                                                                                                                                                                      |
| band_name                       | String      | 1         | “none”                                                                                                                                                                                   |
| long_name                       | String      | 1         | “Rx to specular point range”                                                                                                                                                             |
| units                           | String      | 1         | “m”                                                                                                                                                                                      |
| valid_range                     | float64     | 2         | 0.0,4000000.0                                                                                                                                                                            |
| Description                     | String      | 1         | “Range from receiver to specular point”                                                                                                                                                  |
| <b>SDS53. SDS 名称</b>            | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                           |
| Tx_sp_range<br>GNSS 卫星与镜面反射点间距离 | float64     | [nscans]  | nscans*8                                                                                                                                                                                 |
| <b>SDS 属性名</b>                  | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                 |
| FillValue                       | float64     | 1         | -9999.9                                                                                                                                                                                  |
| Intercept                       | float64     | 1         | 0.0                                                                                                                                                                                      |
| Slope                           | float64     | 1         | 1.0                                                                                                                                                                                      |
| band_name                       | String      | 1         | “none”                                                                                                                                                                                   |
| long_name                       | String      | 1         | “Tx to specular point range”                                                                                                                                                             |
| units                           | String      | 1         | “m”                                                                                                                                                                                      |
| valid_range                     | float64     | 2         | 0.0,50000000.0                                                                                                                                                                           |
| Description                     | String      | 1         | “Range from transmitter to specular point.”                                                                                                                                              |
| <b>SDS54. SDS 名称</b>            | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                           |
| Sp_tcg<br>镜面反射点处的全修正增益          | float64     | [nscans]  | nscans*8                                                                                                                                                                                 |
| <b>SDS 属性名</b>                  | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                 |
| FillValue                       | float64     | 1         | -9999.9                                                                                                                                                                                  |
| Intercept                       | float64     | 1         | “none”                                                                                                                                                                                   |
| Slope                           | float64     | 1         | “none”                                                                                                                                                                                   |
| band_name                       | String      | 1         | “none”                                                                                                                                                                                   |
| long_name                       | String      | 1         | “Total corrected gain at specular point”                                                                                                                                                 |
| units                           | String      | 1         | “none”                                                                                                                                                                                   |
| valid_range                     | float64     | 2         | 0.0,1.0                                                                                                                                                                                  |
| Description                     | String      | 1         | “Sp_tcg is equal to the effective scattering area times brcs_factor and power_factor and divided by                                                                                      |

|             |                                                 |           |
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| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |
|             | 所属主题: L1 数据产品                                   | 页码: 28/38 |

| SDS55. SDS 名称                 | 数据类型        | 维数        | the noise floor at the specular point<br>数据量(字节)                             |
|-------------------------------|-------------|-----------|------------------------------------------------------------------------------|
| Direct_antenna_id<br>直射天线标识   | Int32       | [nscans]  | nscans*4                                                                     |
| <b>SDS 属性名</b>                | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                     |
| FillValue                     | int32       | 1         | -2147483648                                                                  |
| Intercept                     | float64     | 1         | 0.0                                                                          |
| Slope                         | float64     | 1         | 1.0                                                                          |
| band_name                     | String      | 1         | "none"                                                                       |
| long_name                     | String      | 1         | "Direct antenna id"                                                          |
| units                         | String      | 1         | "none"                                                                       |
| valid_range                   | int32       | 2         | 0, 5                                                                         |
| Description                   | String      | 1         | "The flag of the direct signal antenna. 0:foward antenna,5:backward antenna" |
| SDS56. SDS 名称                 | 数据类型        | 维数        | 数据量(字节)                                                                      |
| Direct_signal_noise<br>直射信号噪底 | float64     | [nscans]  | nscans*8                                                                     |
| <b>SDS 属性名</b>                | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                     |
| FillValue                     | float64     | 1         | -9999.9                                                                      |
| Intercept                     | float64     | 1         | 0.0                                                                          |
| Slope                         | float64     | 1         | 1.0                                                                          |
| band_name                     | String      | 1         | "none"                                                                       |
| long_name                     | String      | 1         | "Direct signal noise"                                                        |
| units                         | String      | 1         | "none"                                                                       |
| valid_range                   | float64     | 2         | 10000.0,10000000.0                                                           |
| Description                   | String      | 1         | "The noise floor of direct signal channel with coherent time 1ms."           |
| SDS57. SDS 名称                 | 数据类型        | 维数        | 数据量(字节)                                                                      |
| Direct_signal_snr<br>直射信号的信噪比 | float64     | [nscans]  | nscans*8                                                                     |
| <b>SDS 属性名</b>                | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                     |
| FillValue                     | float64     | 1         | -9999.9                                                                      |
| Intercept                     | float64     | 1         | 0.0                                                                          |
| Slope                         | float64     | 1         | 1.0                                                                          |
| band_name                     | String      | 1         | "none"                                                                       |
| long_name                     | String      | 1         | "Direct signal to noise ratio"                                               |
| units                         | String      | 1         | "dB"                                                                         |
| valid_range                   | float64     | 2         | -100.0,100.0                                                                 |
| Description                   | String      | 1         | "10lg(zenith signal power/zenith signal noise) at ddm_time_utc."             |
| SDS58. SDS 名称                 | 数据类型        | 维数        | 数据量(字节)                                                                      |
| Rx_channel_status<br>反射通道占用状态 | Int32       | [nscans]  | nscans*4                                                                     |
| <b>SDS 属性名</b>                | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                     |
| FillValue                     | int32       | 1         | -2147483648                                                                  |
| Intercept                     | float32     | 1         | 0.0                                                                          |
| Slope                         | float32     | 1         | 1.0                                                                          |
| band_name                     | String      | 1         | "none"                                                                       |
| long_name                     | String      | 1         | "Rx channel status"                                                          |
| units                         | String      | 1         | "none"                                                                       |

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| FY3 数据产品特性卡 | 文件名: <a href="#">L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射)</a> |                  |
|             | 特性集名称: <a href="#">FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</a>           |                  |
|             | 所属主题: <a href="#">L1 数据产品</a>                                   | 页码: <b>29/38</b> |

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|---------------------------------|-------------|-----------------|---------------------------------------------------------------------------------------------------------|
| valid_range                     | int32       | 2               | 0, 2                                                                                                    |
| Description                     | String      | 1               | “The current work status of the reflection channel.0:empty;1:setting;2:tracking the reflection signal”  |
| <b>SDS59. SDS 名称</b>            | <b>数据类型</b> | <b>维数</b>       | <b>数据量(字节)</b>                                                                                          |
| Ddm_range_refer<br>DDM 伪距参考值    | float64     | [nscans]        | nscans*8                                                                                                |
| <b>SDS 属性名</b>                  | <b>数据类型</b> | <b>数量</b>       | <b>值</b>                                                                                                |
| FillValue                       | float64     | 1               | -9999.9                                                                                                 |
| Intercept                       | float64     | 1               | 0.0                                                                                                     |
| Slope                           | float64     | 1               | 1.0                                                                                                     |
| band_name                       | String      | 1               | “none”                                                                                                  |
| long_name                       | String      | 1               | “DDM range reference”                                                                                   |
| units                           | String      | 1               | “m”                                                                                                     |
| valid_range                     | float64     | 2               | 0.0,50000000.0                                                                                          |
| Description                     | String      | 1               | “The initial range (at row 0) of the DDM.”                                                              |
| <b>SDS60. SDS 名称</b>            | <b>数据类型</b> | <b>维数</b>       | <b>数据量(字节)</b>                                                                                          |
| Ddm_doppler_refer<br>DDM 多普勒参考值 | float64     | [nscans]        | nscans*8                                                                                                |
| <b>SDS 属性名</b>                  | <b>数据类型</b> | <b>数量</b>       | <b>值</b>                                                                                                |
| FillValue                       | float64     | 1               | -99999999.9                                                                                             |
| Intercept                       | float64     | 1               | 0.0                                                                                                     |
| Slope                           | float64     | 1               | 1.0                                                                                                     |
| band_name                       | String      | 1               | “none”                                                                                                  |
| long_name                       | String      | 1               | “DDM doppler reference”                                                                                 |
| units                           | String      | 1               | “Hz”                                                                                                    |
| valid_range                     | float64     | 2               | -500000.0,500000.0                                                                                      |
| Description                     | String      | 1               | “The central doppler (at column 10) of the DDM”                                                         |
| <b>SDS61. SDS 名称</b>            | <b>数据类型</b> | <b>维数</b>       | <b>数据量(字节)</b>                                                                                          |
| Ddm_raw_data<br>DDM 波形数据        | float64     | [122*20*nscans] | 122*20*nscans*8                                                                                         |
| <b>SDS 属性名</b>                  | <b>数据类型</b> | <b>数量</b>       | <b>值</b>                                                                                                |
| FillValue                       | float64     | 1               | -99999999.9                                                                                             |
| Intercept                       | float64     | 1               | 0.0                                                                                                     |
| Slope                           | float64     | 1               | 1.0                                                                                                     |
| band_name                       | String      | 1               | “none”                                                                                                  |
| long_name                       | String      | 1               | “DDM bin raw counts”                                                                                    |
| units                           | String      | 1               | “none”                                                                                                  |
| valid_range                     | float64     | 2               | 0.0,4000000000.0                                                                                        |
| Description                     | String      | 1               | “122x20 array of DDM bin raw counts. These are the uncalibrated power values produced by the receiver.” |
| <b>SDS62. SDS 名称</b>            | <b>数据类型</b> | <b>维数</b>       | <b>数据量(字节)</b>                                                                                          |
| Ddm_noise_source<br>DDM 噪底数据源   | Int32       | [nscans]        | nscans*4                                                                                                |
| <b>SDS 属性名</b>                  | <b>数据类型</b> | <b>数量</b>       | <b>值</b>                                                                                                |
| FillValue                       | int32       | 1               | -2147483648                                                                                             |

|             |                                                 |           |  |
|-------------|-------------------------------------------------|-----------|--|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |  |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |  |
|             | 所属主题: L1 数据产品                                   | 页码: 30/38 |  |

|                              |             |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------|-------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Intercept                    | float64     | 1         | 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Slope                        | float64     | 1         | 1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| band_name                    | String      | 1         | "none"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| long_name                    | String      | 1         | "DDM noise source"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| units                        | String      | 1         | "none"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| valid_range                  | int32       | 2         | 0, 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Description                  | String      | 1         | "DDM noise floor source to calculate the mean noise.<br>Source 1: the average of noise_odd and noise_even calculated by the receiver.<br>Source 2: average of counts at delays before -2 chips.<br>Bit 0: the average of source 1 and source 2.<br>Bit 1: source 1 because the relative difference between source 1 and source 2 is too large.<br>Bit 2: source 1 because the number of counts in source 2 is less than 600.<br>Bit 3: source 1 because the number of rows in source 2 is less than 1." |
| <b>SDS63. SDS 名称</b>         | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Ddm_noise_raw<br>DDM 噪底原始采样值 | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>SDS 属性名</b>               | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| FillValue                    | float64     | 1         | -9999.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Intercept                    | float64     | 1         | 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Slope                        | float64     | 1         | 1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| band_name                    | String      | 1         | "none"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| long_name                    | String      | 1         | "DDM noise raw"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| units                        | String      | 1         | "none"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| valid_range                  | float64     | 2         | 0.0,4000000000.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Description                  | String      | 1         | "The mean noise floor of the raw DDM"                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>SDS64. SDS 名称</b>         | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Ddm_noise_m<br>DDM 噪底 M 值    | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>SDS 属性名</b>               | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| FillValue                    | float64     | 1         | -9999.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Intercept                    | float64     | 1         | 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Slope                        | float64     | 1         | 1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| band_name                    | String      | 1         | "none"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| long_name                    | String      | 1         | "DDM noise m"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| units                        | String      | 1         | "none"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| valid_range                  | float64     | 2         | 0.0,2000.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Description                  | String      | 1         | "The ratio of the square of the mean of the noise floor and the variance of the noise floor"                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>SDS65. SDS 名称</b>         | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Ddm_peak_raw                 | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

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|-------------|-------------------------------------------------|-----------|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |
|             | 所属主题: L1 数据产品                                   | 页码: 31/38 |

| DDM 峰值原始采样值                  |         |          |                                                                                                                                                                        |
|------------------------------|---------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SDS 属性名                      | 数据类型    | 数量       | 值                                                                                                                                                                      |
| FillValue                    | float64 | 1        | -9999.9                                                                                                                                                                |
| Intercept                    | float64 | 1        | 0.0                                                                                                                                                                    |
| Slope                        | float64 | 1        | 1.0                                                                                                                                                                    |
| band_name                    | String  | 1        | "none"                                                                                                                                                                 |
| long_name                    | String  | 1        | "DDM peak raw"                                                                                                                                                         |
| units                        | String  | 1        | "none"                                                                                                                                                                 |
| valid_range                  | float64 | 2        | 0.0,4000000000.0                                                                                                                                                       |
| Description                  | String  | 1        | "Peak value in DDM raw counts"                                                                                                                                         |
| SDS66. SDS 名称                | 数据类型    | 维数       | 数据量(字节)                                                                                                                                                                |
| Ddm_sp_raw<br>DDM 镜面反射点原始采样值 | float64 | [nscans] | nscans*8                                                                                                                                                               |
| SDS 属性名                      | 数据类型    | 数量       | 值                                                                                                                                                                      |
| FillValue                    | float64 | 1        | -9999.9                                                                                                                                                                |
| Intercept                    | float64 | 1        | 0.0                                                                                                                                                                    |
| Slope                        | float64 | 1        | 1.0                                                                                                                                                                    |
| band_name                    | String  | 1        | "none"                                                                                                                                                                 |
| long_name                    | String  | 1        | "DDM specular point raw"                                                                                                                                               |
| units                        | String  | 1        | "none"                                                                                                                                                                 |
| valid_range                  | float64 | 2        | 0.0,4000000000.0                                                                                                                                                       |
| Description                  | String  | 1        | "Value of the specular point in the DDM raw counts"                                                                                                                    |
| SDS67. SDS 名称                | 数据类型    | 维数       | 数据量(字节)                                                                                                                                                                |
| Ddm_peak_snr<br>DDM 峰值信噪比    | float64 | [nscans] | nscans*8                                                                                                                                                               |
| SDS 属性名                      | 数据类型    | 数量       | 值                                                                                                                                                                      |
| FillValue                    | float64 | 1        | -9999.9                                                                                                                                                                |
| Intercept                    | float64 | 1        | 0.0                                                                                                                                                                    |
| Slope                        | float64 | 1        | 1.0                                                                                                                                                                    |
| band_name                    | String  | 1        | "none"                                                                                                                                                                 |
| long_name                    | String  | 1        | "DDM peak snr"                                                                                                                                                         |
| units                        | String  | 1        | "dB"                                                                                                                                                                   |
| valid_range                  | float64 | 2        | -200.0,50.0                                                                                                                                                            |
| Description                  | String  | 1        | "10lg(S_max/N_avg-1), where Smax is the maximum value (in raw counts) in a single DDM bin and Navg is the the average per-bin raw noise counts, at ddm_timestamp_utc." |
| SDS68. SDS 名称                | 数据类型    | 维数       | 数据量(字节)                                                                                                                                                                |
| Ddm_sp_snr<br>DDM 镜面反射点信噪比   | float64 | [nscans] | nscans*8                                                                                                                                                               |
| SDS 属性名                      | 数据类型    | 数量       | 值                                                                                                                                                                      |
| FillValue                    | float64 | 1        | -9999.9                                                                                                                                                                |
| Intercept                    | float64 | 1        | 0.0                                                                                                                                                                    |
| Slope                        | float64 | 1        | 1.0                                                                                                                                                                    |
| band_name                    | String  | 1        | "none"                                                                                                                                                                 |
| long_name                    | String  | 1        | "DDM specular point SNR"                                                                                                                                               |
| units                        | String  | 1        | "dB"                                                                                                                                                                   |
| valid_range                  | float64 | 2        | -200.0,50.0                                                                                                                                                            |

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|-------------|-------------------------------------------------|-----------|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |
|             | 所属主题: L1 数据产品                                   | 页码: 32/38 |

|                                  |             |               |                                                                                                                                                                                  |
|----------------------------------|-------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                      | String      | 1             | “10lg(S_sp/N_avg-1), where S_sp is the value of specular point (in raw counts) in a single DDM bin and N_avg is the the average per-bin raw noise counts, at ddm_timestamp_utc.” |
| <b>SDS69. SDS 名称</b>             | <b>数据类型</b> | <b>维数</b>     | <b>数据量(字节)</b>                                                                                                                                                                   |
| Ddm_effective_area<br>DDM 有效散射面积 | float64     | [9*20*nscans] | 9*20*nscans*8                                                                                                                                                                    |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b>     | <b>值</b>                                                                                                                                                                         |
| FillValue                        | float64     | 1             | -9999.9                                                                                                                                                                          |
| Intercept                        | float64     | 1             | 0.0                                                                                                                                                                              |
| Slope                            | float64     | 1             | 1.0                                                                                                                                                                              |
| band_name                        | String      | 1             | “none”                                                                                                                                                                           |
| long_name                        | String      | 1             | “DDM effective scattering area”                                                                                                                                                  |
| units                            | String      | 1             | “dBm <sup>2</sup> ”                                                                                                                                                              |
| valid_range                      | float64     | 2             | 0.0,100.0                                                                                                                                                                        |
| Description                      | String      | 1             | “The effective scattering area of the 9x20 region of the DDM used to calculate DDM_NBRCS.”                                                                                       |
| <b>SDS70. SDS 名称</b>             | <b>数据类型</b> | <b>维数</b>     | <b>数据量(字节)</b>                                                                                                                                                                   |
| Ddm_sp_les<br>DDM 波形前沿斜率         | float64     | [nscans]      | nscans*8                                                                                                                                                                         |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b>     | <b>值</b>                                                                                                                                                                         |
| FillValue                        | float64     | 1             | -9999.9                                                                                                                                                                          |
| Intercept                        | float64     | 1             | 0.0                                                                                                                                                                              |
| Slope                            | float64     | 1             | 1.0                                                                                                                                                                              |
| band_name                        | String      | 1             | “none”                                                                                                                                                                           |
| long_name                        | String      | 1             | “DDM specular point LES”                                                                                                                                                         |
| units                            | String      | 1             | “dB”                                                                                                                                                                             |
| valid_range                      | float64     | 2             | -200.0,200.0                                                                                                                                                                     |
| Description                      | String      | 1             | “Leading edge slope of a 3 delay x 5 Doppler bin box centered at the specular point bin.”                                                                                        |
| <b>SDS71. SDS 名称</b>             | <b>数据类型</b> | <b>维数</b>     | <b>数据量(字节)</b>                                                                                                                                                                   |
| Ddm_sp_dles<br>DDM 波形前沿二阶导数      | float64     | [nscans]      | nscans*8                                                                                                                                                                         |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b>     | <b>值</b>                                                                                                                                                                         |
| FillValue                        | float64     | 1             | -9999.9                                                                                                                                                                          |
| Intercept                        | float64     | 1             | 0.0                                                                                                                                                                              |
| Slope                            | float64     | 1             | 1.0                                                                                                                                                                              |
| band_name                        | String      | 1             | “none”                                                                                                                                                                           |
| long_name                        | String      | 1             | “DDM specular point DLES”                                                                                                                                                        |
| units                            | String      | 1             | “dB”                                                                                                                                                                             |
| valid_range                      | float64     | 2             | -200.0,200.0                                                                                                                                                                     |
| Description                      | String      | 1             | “The slope of the second derivative of the DDM's leading edge slope”                                                                                                             |
| <b>SDS 72. SDS 名称</b>            | <b>数据类型</b> | <b>维数</b>     | <b>数据量(字节)</b>                                                                                                                                                                   |
| Ddm_quality_flag<br>DDM 质量标识符    | int32       | [nscans]      | nscans*4                                                                                                                                                                         |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b>     | <b>值</b>                                                                                                                                                                         |



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|-------------|-------------------------------------------------|-----------|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |
|             | 所属主题: L1 数据产品                                   | 页码: 33/38 |

|             |         |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------|---------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FillValue   | int32   | 1 | -2147483648                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Intercept   | float64 | 1 | "none"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Slope       | float64 | 1 | "none"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| band_name   | String  | 1 | "none"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| long_name   | String  | 1 | "DDM quality flag"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| units       | String  | 1 | "none"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| valid_range | int32   | 2 | 0, 2147483647                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Description | String  | 1 | <p>The L1 DDM quality flag of processing:</p> <p>Bit 0: Set to 1 if overall quality is poor.</p> <p>Bit 1: Set to 1 if any absolute value of the spacecraft roll/pitch/yaw is greater than the threshold.</p> <p>Bit 2: Set to 1 if the absolute value of LNA temperature's change rate is greater than the threshold.</p> <p>Bit 3: Set to 1 if the difference between this DDM noise floor and the previous DDM noise floor is greater than the threshold.</p> <p>Bit 4: Set to 1 if the AGC status between this DDM and the previous DDM is different.</p> <p>Bit 5: Set to 1 if the difference of the DDM noise floor calculated by two different methods is greater than the threshold.</p> <p>Bit 6: Set to 1 if the specular point is over land.</p> <p>Bit 7: Set to 1 if the specular point is within 25 km of land.</p> <p>Bit 8: Set to 1 if direct_signal_exists in the DDM: The absolute value of the difference between the direct signal code phase and the DDM signal code phase is less than 12.5 chips.</p> <p>Bit 9: Set to 1 if RFI is detected.</p> <p>Bit 10: Set to 1 if the estimated specular point delay has a high uncertainty.</p> <p>Bit 11: Set to 1 if the estimated specular point Doppler has a high uncertainty.</p> <p>Bit 12: Set to 1 if the spacecraft's altitude is out of nominal altitude range.</p> <p>Bit 13: Set to 1 if DDM power calibration conditions' temperature is out of normal range.</p> <p>Bit 14: Set to 1 if DDM power calibration conditions' AGC value is out of normal range.</p> |

|                    |                                                                 |                  |
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| <b>FY3 数据产品特性卡</b> | 文件名: <a href="#">L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射)</a> |                  |
|                    | 特性集名称: <a href="#">FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</a>           |                  |
|                    | 所属主题: <a href="#">L1 数据产品</a>                                   | 页码: <b>34/38</b> |

|                                  |             |           |                                                                                                                                                                                                                                                                                                         |
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|                                  |             |           | <p>Bit 15: Set to 1 if the EIRP information of the GNSS satellite is unknown.</p> <p>Bit 16: Set to 1 if negative value exists in the BRCS matrix used to calculate NBRCS.</p> <p>Bit 17: Set to 1 if the specular point is over sea ice.</p> <p>Bit 18: Set to 1 if the effective area is invalid.</p> |
| <b>SDS73. SDS 名称</b>             | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                                                          |
| Ddm_sp_nbrcs<br>镜面反射点归一化双基雷达散射截面 | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                                                |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                                                |
| FillValue                        | float64     | 1         | -9999.9                                                                                                                                                                                                                                                                                                 |
| Intercept                        | float64     | 1         | 0.0                                                                                                                                                                                                                                                                                                     |
| Slope                            | float64     | 1         | 1.0                                                                                                                                                                                                                                                                                                     |
| band_name                        | String      | 1         | "none"                                                                                                                                                                                                                                                                                                  |
| long_name                        | String      | 1         | "DDM specular point NBRCS"                                                                                                                                                                                                                                                                              |
| units                            | String      | 1         | "dB"                                                                                                                                                                                                                                                                                                    |
| valid_range                      | float64     | 2         | -200.0, 200.0                                                                                                                                                                                                                                                                                           |
| Description                      | String      | 1         | "Normalized BRCS of a 3 delay x 5 Doppler bin box centered at the specular point bin."                                                                                                                                                                                                                  |
| <b>SDS74. SDS 名称</b>             | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                                                          |
| Ddm_sp_row<br>DDM 镜面反射点的行位置      | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                                                |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                                                |
| FillValue                        | float64     | 1         | -9999.9                                                                                                                                                                                                                                                                                                 |
| Intercept                        | float64     | 1         | 0.0                                                                                                                                                                                                                                                                                                     |
| Slope                            | float64     | 1         | 1.0                                                                                                                                                                                                                                                                                                     |
| band_name                        | String      | 1         | "none"                                                                                                                                                                                                                                                                                                  |
| long_name                        | String      | 1         | "DDM specular point row"                                                                                                                                                                                                                                                                                |
| units                            | String      | 1         | "none"                                                                                                                                                                                                                                                                                                  |
| valid_range                      | float64     | 2         | 0.0,121.0                                                                                                                                                                                                                                                                                               |
| Description                      | String      | 1         | "The zero-based delay row of the specular point delay in the DDM based on the specular point calculated on the ground."                                                                                                                                                                                 |
| <b>SDS75. SDS 名称</b>             | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                                                          |
| Ddm_sp_column<br>DDM 镜面反射点的列位置   | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                                                |
| <b>SDS 属性名</b>                   | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                                                |
| FillValue                        | float64     | 1         | -9999.9                                                                                                                                                                                                                                                                                                 |
| Intercept                        | float64     | 1         | 0.0                                                                                                                                                                                                                                                                                                     |
| Slope                            | float64     | 1         | 1.0                                                                                                                                                                                                                                                                                                     |
| band_name                        | String      | 1         | "none"                                                                                                                                                                                                                                                                                                  |
| long_name                        | String      | 1         | "DDM specular point column"                                                                                                                                                                                                                                                                             |
| units                            | String      | 1         | "none"                                                                                                                                                                                                                                                                                                  |
| valid_range                      | float64     | 2         | 0.0,19.0                                                                                                                                                                                                                                                                                                |

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| FY3 数据产品特性卡 | 文件名: <a href="#">L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射)</a> |           |
|             | 特性集名称: <a href="#">FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品</a>           |           |
|             | 所属主题: <a href="#">L1 数据产品</a>                                   | 页码: 35/38 |

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|---------------------------------|-------------|-----------|--------------------------------------------------------------------------------------------------------------------------------|
| Description                     | String      | 1         | “The zero-based Doppler column of the specular point doppler in the DDM based on the specular point calculated on the ground.” |
| <b>SDS76. SDS 名称</b>            | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                 |
| Ddm_sp_delay<br>DDM 镜面反射点的时延    | float64     | [nscans]  | nscans*8                                                                                                                       |
| <b>SDS 属性名</b>                  | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                       |
| FillValue                       | float64     | 1         | -9999.9                                                                                                                        |
| Intercept                       | float64     | 1         | “none”                                                                                                                         |
| Slope                           | float64     | 1         | “none”                                                                                                                         |
| band_name                       | String      | 1         | “none”                                                                                                                         |
| long_name                       | String      | 1         | “DDM specular point delay”                                                                                                     |
| units                           | String      | 1         | “chips”                                                                                                                        |
| valid_range                     | float64     | 2         | -15.25,15                                                                                                                      |
| Description                     | String      | 1         | “Specular point delay in the DDM”                                                                                              |
| <b>SDS77. SDS 名称</b>            | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                 |
| Ddm_sp_doppler<br>DDM 镜面反射点的多普勒 | float64     | [nscans]  | nscans*8                                                                                                                       |
| <b>SDS 属性名</b>                  | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                       |
| FillValue                       | float64     | 1         | -9999.9                                                                                                                        |
| Intercept                       | float64     | 1         | 0.0                                                                                                                            |
| Slope                           | float64     | 1         | 1.0                                                                                                                            |
| band_name                       | String      | 1         | “none”                                                                                                                         |
| long_name                       | String      | 1         | “DDM specular point doppler”                                                                                                   |
| units                           | String      | 1         | “Hz”                                                                                                                           |
| valid_range                     | float64     | 2         | -5000,4500                                                                                                                     |
| Description                     | String      | 1         | “Specular point Doppler in the DDM”                                                                                            |
| <b>SDS78. SDS 名称</b>            | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                 |
| Ddm_peak_row<br>DDM 峰值点的行位置     | float64     | [nscans]  | nscans*8                                                                                                                       |
| <b>SDS 属性名</b>                  | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                       |
| FillValue                       | float64     | 1         | -9999.9                                                                                                                        |
| Intercept                       | float64     | 1         | “none”                                                                                                                         |
| Slope                           | float64     | 1         | “none”                                                                                                                         |
| band_name                       | String      | 1         | “none”                                                                                                                         |
| long_name                       | String      | 1         | “DDM peak bin row”                                                                                                             |
| units                           | String      | 1         | “none”                                                                                                                         |
| valid_range                     | float64     | 2         | 0.0,121.0                                                                                                                      |
| Description                     | String      | 1         | “The zero-based delay row of the peak value in the DDM”                                                                        |
| <b>SDS79. SDS 名称</b>            | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                 |
| Ddm_peak_column<br>DDM 峰值点的列位置  | float64     | [nscans]  | nscans*8                                                                                                                       |
| <b>SDS 属性名</b>                  | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                       |
| FillValue                       | float64     | 1         | -9999.9                                                                                                                        |
| Intercept                       | float64     | 1         | 0.0                                                                                                                            |
| Slope                           | float64     | 1         | 1.0                                                                                                                            |
| band_name                       | String      | 1         | “none”                                                                                                                         |
| long_name                       | String      | 1         | “DDM peak bin column”                                                                                                          |

|             |                                                 |           |  |
|-------------|-------------------------------------------------|-----------|--|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |  |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |  |
|             | 所属主题: L1 数据产品                                   | 页码: 36/38 |  |

|                                             |             |           |                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------|-------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| units                                       | String      | 1         | "none"                                                                                                                                                                                                                                                                                                          |
| valid_range                                 | float64     | 2         | 0.0,19.0                                                                                                                                                                                                                                                                                                        |
| Description                                 | String      | 1         | "The zero-based Doppler column of the peak value in the DDM"                                                                                                                                                                                                                                                    |
| <b>SDS80. SDS 名称</b>                        | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                                                                  |
| Ddm_peak_delay<br>DDM 峰值点的时延                | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                                                        |
| <b>SDS 属性名</b>                              | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                                                        |
| FillValue                                   | float64     | 1         | -9999.9                                                                                                                                                                                                                                                                                                         |
| Intercept                                   | float64     | 1         | 0.0                                                                                                                                                                                                                                                                                                             |
| Slope                                       | float64     | 1         | 1.0                                                                                                                                                                                                                                                                                                             |
| band_name                                   | String      | 1         | "none"                                                                                                                                                                                                                                                                                                          |
| long_name                                   | String      | 1         | "DDM peak bin delay"                                                                                                                                                                                                                                                                                            |
| units                                       | String      | 1         | "chips"                                                                                                                                                                                                                                                                                                         |
| valid_range                                 | float64     | 2         | -15.25,15.0                                                                                                                                                                                                                                                                                                     |
| Description                                 | String      | 1         | "Delay of the DDM peak bin, in corresponding GNSS system chip"                                                                                                                                                                                                                                                  |
| <b>SDS81. SDS 名称</b>                        | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                                                                  |
| Ddm_peak_doppler<br>DDM 峰值点的多普勒             | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                                                        |
| <b>SDS 属性名</b>                              | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                                                        |
| FillValue                                   | float64     | 1         | -9999.9                                                                                                                                                                                                                                                                                                         |
| Intercept                                   | float64     | 1         | 0.0                                                                                                                                                                                                                                                                                                             |
| Slope                                       | float64     | 1         | 1.0                                                                                                                                                                                                                                                                                                             |
| band_name                                   | String      | 1         | "none"                                                                                                                                                                                                                                                                                                          |
| long_name                                   | String      | 1         | "DDM peak bin doppler"                                                                                                                                                                                                                                                                                          |
| units                                       | String      | 1         | "Hz"                                                                                                                                                                                                                                                                                                            |
| valid_range                                 | float64     | 2         | -5000,4500                                                                                                                                                                                                                                                                                                      |
| Description                                 | String      | 1         | "Doppler of the DDM peak bin"                                                                                                                                                                                                                                                                                   |
| <b>SDS82. SDS 名称</b>                        | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                                                                  |
| Sp_delay_doppler_flag<br>DDM 波形镜反点判断可靠性的标识符 | int32       | [nscans]  | nscans*4                                                                                                                                                                                                                                                                                                        |
| <b>SDS 属性名</b>                              | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                                                        |
| FillValue                                   | int32       | 1         | -2147483648                                                                                                                                                                                                                                                                                                     |
| Intercept                                   | float32     | 1         | 0.0                                                                                                                                                                                                                                                                                                             |
| Slope                                       | float32     | 1         | 1.0                                                                                                                                                                                                                                                                                                             |
| band_name                                   | String      | 1         | "none"                                                                                                                                                                                                                                                                                                          |
| long_name                                   | String      | 1         | "Specular point delay doppler flag"                                                                                                                                                                                                                                                                             |
| units                                       | String      | 1         | "none"                                                                                                                                                                                                                                                                                                          |
| valid_range                                 | int32       | 2         | 0,100                                                                                                                                                                                                                                                                                                           |
| Description                                 | String      | 1         | "The method and quality flag to find specular position in DDM:<br>0: Interpolation and derivative method are used. The delay, doppler values corresponding to the specular point are not out of the normal range.<br>1: Interpolation and SSH modified method are used because the derivative method has a high |

|             |                                                 |           |
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| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |           |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |           |
|             | 所属主题: L1 数据产品                                   | 页码: 37/38 |

|                                     |             |           |                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------|-------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     |             |           | uncertainty.<br>2: The specular point is over non-sea surface. After interpolation, the specular position is set to be the peak position.<br>3: Only SSH modified method is used because the SNR is low.<br>4: The specular point is over non-sea surface and the SNR is low. The specular position is set to be the peak position without interpolation.” |
| <b>SDS83. SDS 名称</b>                | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                                                                                                             |
| Ddm_power_factor<br>DDM 功率计算系数      | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                                                                                                   |
| <b>SDS 属性名</b>                      | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                                                                                                   |
| FillValue                           | float64     | 1         | -9999.9                                                                                                                                                                                                                                                                                                                                                    |
| Intercept                           | float64     | 1         | 0.0                                                                                                                                                                                                                                                                                                                                                        |
| Slope                               | float64     | 1         | 1.0                                                                                                                                                                                                                                                                                                                                                        |
| band_name                           | String      | 1         | “none”                                                                                                                                                                                                                                                                                                                                                     |
| long_name                           | String      | 1         | “Factor used to compute DDM power”                                                                                                                                                                                                                                                                                                                         |
| units                               | String      | 1         | “dBW <sup>-1</sup> ”                                                                                                                                                                                                                                                                                                                                       |
| valid_range                         | float64     | 2         | 150.0,300.0                                                                                                                                                                                                                                                                                                                                                |
| Description                         | String      | 1         | “Factor used to compute DDM power (dBW) from DDM counts (counts/power)”                                                                                                                                                                                                                                                                                    |
| <b>SDS84. SDS 名称</b>                | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                                                                                                             |
| Ddm_brcs_factor<br>DDM 双基雷达散射截面计算系数 | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                                                                                                   |
| <b>SDS 属性名</b>                      | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                                                                                                   |
| FillValue                           | float64     | 1         | -9999.9                                                                                                                                                                                                                                                                                                                                                    |
| Intercept                           | float64     | 1         | 0.0                                                                                                                                                                                                                                                                                                                                                        |
| Slope                               | float64     | 1         | 1.0                                                                                                                                                                                                                                                                                                                                                        |
| band_name                           | String      | 1         | “none”                                                                                                                                                                                                                                                                                                                                                     |
| long_name                           | String      | 1         | “Factor used to compute DDM BRCS (power/BRCS)”                                                                                                                                                                                                                                                                                                             |
| units                               | String      | 1         | “dBW/dBm <sup>2</sup> ”                                                                                                                                                                                                                                                                                                                                    |
| valid_range                         | float64     | 2         | -350.0,-200.0                                                                                                                                                                                                                                                                                                                                              |
| Description                         | String      | 1         | “Factor used to compute DDM BRCS (dBm <sup>2</sup> ) from DDM power (dBW)”                                                                                                                                                                                                                                                                                 |
| <b>SDS85. SDS 名称</b>                | <b>数据类型</b> | <b>维数</b> | <b>数据量(字节)</b>                                                                                                                                                                                                                                                                                                                                             |
| Ddm_sp_normalized_snr<br>归一化镜像点信噪比  | float64     | [nscans]  | nscans*8                                                                                                                                                                                                                                                                                                                                                   |
| <b>SDS 属性名</b>                      | <b>数据类型</b> | <b>数量</b> | <b>值</b>                                                                                                                                                                                                                                                                                                                                                   |
| FillValue                           | float64     | 1         | -9999.9                                                                                                                                                                                                                                                                                                                                                    |
| Intercept                           | float64     | 1         | 0.0                                                                                                                                                                                                                                                                                                                                                        |
| Slope                               | float64     | 1         | 1.0                                                                                                                                                                                                                                                                                                                                                        |
| band_name                           | String      | 1         | “none”                                                                                                                                                                                                                                                                                                                                                     |
| long_name                           | String      | 1         | “Normalized SNR at specular                                                                                                                                                                                                                                                                                                                                |

|             |                                                 |  |           |
|-------------|-------------------------------------------------|--|-----------|
| FY3 数据产品特性卡 | 文件名: L1 数据产品特性卡_FY-3E 全球导航卫星掩星探测仪-II 型(GNSS 反射) |  |           |
|             | 特性集名称: FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据产品           |  |           |
|             | 所属主题: L1 数据产品                                   |  | 页码: 38/38 |

|             |         |   |                                                                |
|-------------|---------|---|----------------------------------------------------------------|
|             |         |   | point”                                                         |
| units       | String  | 1 | “dBW <sup>-1</sup> ”                                           |
| valid_range | float64 | 2 | 0.0,300.0                                                      |
| Description | String  | 1 | “SNR at specular point normalized by bistatic radar equation.” |

## 2.5 数据填充值

表7. FY-3E 全球导航卫星掩星探测仪-II 型 L1 数据 (GNSS 反射) 填充值说明

| 序号 | 数据类型    | 填充值                                 | 说明                 |
|----|---------|-------------------------------------|--------------------|
| 1. | Int32   | -2147483648                         |                    |
| 2. | Float64 | -9999.9 或-9999999.9<br>或-99999999.9 | 如有覆盖正常值,<br>可做适当调整 |