

# 1 MWTS/MWHS 融合大气温湿度廓线/稳定度指数/位势高度产品

## 1.1 数据概况

表1. MWTS/MWHS 融合大气温湿度廓线/稳定度指数/位势高度产品概况表

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 产品名称      | MWTS/MWHS 融合大气温湿度廓线/稳定度指数/位势高度产品                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|           | MWTS/MWHS Merged Atmospheric Temperature and Humidity profiles/Stability index/ Geopotential height                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 物理意义（中英文） | 由 MWTS/MWHS 融合数据集反演的全球逐轨道大气温湿度廓线/稳定度指数/位势高度产品。产品为 MWTS 原始轨道分辨率（星下点约 33Km），未做投影处理，内容包括：每条扫描线 90 个像元的地理经纬度、海陆掩码、高程、太阳天顶角/方位角、卫星天顶角/方位角、天和毫秒计数数据，以及每个 MWTS 视场的 MWTS 亮温、匹配 MWHS 亮温、云量（融合自成像仪）、洋面降水检测（MWHS）、大气温湿度廓线、稳定度指数、位势高度以及由数值预报场插值至 MWTS 视场的大气温湿度廓线、表皮温度、地表温度、地表气压、地表湿度和地表风矢量资料。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|           | The 33km product includes global atmospheric temperature and humidity profiles retrieved from 13 MWTS microwave channels, 15 MWHS microwave channels and Imagery cloud mask which has been matched onto pixels of MWTS. It contains latitude, longitude, land-sea mask, and surface height, solar zenith angle, solar azimuth angle, satellite zenith angle, satellite azimuth angle as well as day and milisecond counter of 90 MWTS pixels per scan line. Meanwhile, brightness temperature of MWTS, and MWHS, cloud percentage, oceanic rain screen, scattering Index, atmospheric temperature and humidity profile, stability indexes, geopotential height product as well as atmospheric temperature and humidity profiles, surface skin temperature, surface temperature, surface pressure, surface moisture and surface wind vector interploated from |

|         |                                                                                                                                                                                                                                  |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | NWP on each pixel are also included in the database.                                                                                                                                                                             |
| 用途（中英文） | 天气分析，数值预报资料同化，气候变化研究等。                                                                                                                                                                                                           |
|         | Weather analysis, data assimilation in numerical weather/climatic prediction, research on climate change, etc.                                                                                                                   |
| 用户（中英文） | 国家气象中心，国家气候中心，气象科学研究院，中国科学院相关单位，全国大学相关研究单位，地方气象部门。                                                                                                                                                                               |
|         | National Meteorological Center, National Climate Center, Chinese Academy of Meteorological Sciences, related agencies of Chinese Academy of Sciences, relevant research Units of universities, and local meteorological bureaus. |
| 备注（中英文） |                                                                                                                                                                                                                                  |
|         |                                                                                                                                                                                                                                  |

## 1.2 数据基本信息

表2. MWTS/MWHS 融合大气温湿度廓线/稳定度指数/位势高度产品基本信息表

| 产品名称：MWTS/MWHS 融合大气温湿度廓线/稳定度指数/位势高度产品                                |       |    |
|----------------------------------------------------------------------|-------|----|
| 文件名称约定：<br>FY3D_TSHSX_ORBT_L2_AVP_MLT_NUL_YYYYMMDD_HHmm_033KM_MS.HDF |       |    |
| 栏目                                                                   | 值     | 备注 |
| 卫星名                                                                  | FY3D  |    |
| 仪器名称                                                                 | TSHS  |    |
| 数据区域类型                                                               | ORBT  |    |
| 数据级别                                                                 | L2    |    |
| 数据名称                                                                 | AVP   |    |
| 通道名称                                                                 | MLT   |    |
| 投影方式                                                                 | NUL   |    |
| 时段类型                                                                 | HHmm  |    |
| 分辨率                                                                  | 033KM |    |
| 数据格式名称                                                               | HDF   |    |
| 分块方式                                                                 | 不分块   |    |
| 更新频率                                                                 | 1     |    |
| 更新频率单位                                                               | ORBT  |    |
| 单个文件数据量                                                              | 100   |    |
| 数据量单位                                                                | MB    |    |

## 2 L1 数据规格

### 2.1 HDF 数据格式结构

表3. MWTS/MWHS 融合大气温湿度廓线/稳定度指数/位势高度产品 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 |                    | 科学数据集名(英文)                                       | 科学数据集中文描述                            |
| GEO    | SDS1  | MWTS_Scnlin        | MWTS Scan Line Number                            | MWTS 扫描线号                            |
|        | SDS2  | MWTS_Scnlin_daycnt | MWTS Scan Line Time(day counter)                 | MWTS 扫描线时间的天计数                       |
|        | SDS3  | MWTS_Scnlin_mscnt  | MWTS Scan Line Time (milliseconds counter)       | MWTS 扫描线时间的毫秒计数                      |
|        | SDS4  | Latitude           | Latitude of MWTS pixel                           | MWTS 像元的纬度                           |
|        | SDS5  | Longitude          | Longitude of MWTS pixel                          | MWTS 像元的经度                           |
|        | SDS6  | Sun_Zen_ang        | Sun Zenith Angle                                 | 太阳天顶角                                |
|        | SDS7  | Sun_Amu_ang        | Sun Azimuth Angle                                | 太阳方位角                                |
|        | SDS8  | Sat_Zen_ang        | Satellite Zenith Angle                           | 卫星天顶角                                |
|        | SDS9  | Sat_Amu_ang        | Satellite Azimuth Angle                          | 卫星方位角                                |
|        | SDS10 | Land_Sea_Mask      | Land/Sea mask                                    | 海陆掩码                                 |
|        | SDS11 | DEM                | Digital Elevation Model                          | 地表高程数据                               |
| DATA   | SDS12 | Cloud              | Cloud Percentage of MWTS Pixel (From Imager)     | MWTS 视场的成像仪匹配云量                      |
|        | SDS13 | RAIN               | Oceanic Rain Screen of MWTS Pixel (From MWHS)    | MWTS 视场的降水检测                         |
|        | SDS14 | MWTS_Ch_BT         | MWTS Brightness Temperature                      | MWTS 通道亮温                            |
|        | SDS15 | MWHS_Ch_BT         | MWHS Brightness Temperature                      | MWHS 通道亮温                            |
|        | SDS16 | TSHS_AT_Prof       | Atmospheric temperature profile of TSHS          | TSHS 反演的大气温度廓线, 43 层, 1013.25-0.1hPa |
|        | SDS17 | TSHS_AH_Prof       | Atmospheric Humidity profile of TSHS             | TSHS 反演的大气湿度廓线, 43 层, 1013.25-0.1hPa |
|        | SDS18 | TT                 | Total Temperature Index                          | TT 指数                                |
|        | SDS19 | KI                 | K Index                                          | K 指数                                 |
|        | SDS20 | SI                 | Showalter Index                                  | SI 指数                                |
|        | SDS21 | LI                 | Lifted Index                                     | 抬升指数                                 |
|        | SDS22 | Geo_Hht            | Geo_Height                                       | 位势高度                                 |
| AUX    | SDS23 | NWP_ATProf         | Interpolated NWP Atmospheric Temperature Profile | 插值的 NWP 大气温度廓线                       |
|        | SDS24 | NWP_AHProf         | Interplated NWP Atmospheric Humidity             | 插值的 NWP 大气湿度                         |

|      |       |               |                                      |                 |
|------|-------|---------------|--------------------------------------|-----------------|
|      |       |               | Profile                              | 廓线              |
|      | SDS25 | NWP_Surf_Pres | NWP Surface Pressure                 | 插值的 NWP 表面气压    |
|      | SDS26 | NWP_Surf_Temp | NWP Surface Temperature              | 插值的 NWP 2m 气温   |
|      | SDS27 | NWP_Surf_Wv   | NWP Surface Humidity                 | 插值的 NWP 2m 湿度   |
|      | SDS28 | NWP_Skin_Temp | NWP Surface Skin Temperature         | 插值的 NWP 表皮温度    |
|      | SDS29 | NWP_Surf_Wind | NWP Surface Wind                     | 插值的 NWP 10m 风向量 |
| QA   | SDS30 | Qa_Flag_MWTS  | MWTS OBS Quality Flag                | MWTS 亮温质量标识     |
|      | SDS31 | Qa_Flag_MWHS  | MWHS OBS Quality Flag                | MWHS 亮温质量标识     |
|      | SDS32 | Qa_Flag_Cloud | Cloud Amount Quality Flag            | 匹配云量质量标识        |
|      | SDS33 | Qa_Flag_Rain  | Rain Quality Flag                    | 匹配降水检测质量标识      |
|      | SDS34 | Qa_Flag_AVP   | TSHS AVP QualityFlag                 | TSHS 反演产品质量标识   |
| DATA | SDS35 | Pressure      | Vertical Axis of Atmospheric profile | 大气廓线气压坐标        |
|      | SDS36 | Scatter Index | Scatter Index                        | 散射指数            |
|      | SDS37 | Sea Ice       | Sea Ice                              | 海冰标识            |
|      | SDS38 | TOTO3         | Total ozone amount of MWTS Pixel     | 臭氧含量            |

2.2 全局文件属性

表4. MWTS/MWHS 融合大气温湿度廓线/稳定度指数/位势高度产品全局文件属性定义

| 描述    | 属性名称            | 数据类型              | 数量  | 值                                                         |
|-------|-----------------|-------------------|-----|-----------------------------------------------------------|
| 卫星名称  | Satellite Name  | 8-bit signed char | 5   | FY-3D                                                     |
| 数据集名称 | Dataset Name    | 8-bit signed char | 不定长 | Temperature/Humidity Profile and derivity                 |
| 文件名称  | File Name       | 8-bit signed char | 不定长 | FY3D_TSHSX_ORBT_L2_AVP_MLT_NUL_YYYYMMDD_HHmm_033KM_MS.HDF |
| 文件别名  | File Alias Name | 8-bit signed char | 不定长 |                                                           |
| 仪器名称  | Sensor Name     | 8-bit signed char | 不定长 | TSHS                                                      |
| 数据集区域 | Dataset Area    | 8-bit signed char | 不定长 | Orbit                                                     |
| 数据级别  | Data Level      | 8-bit signed char | 2   | L2                                                        |

| 描述                  | 属性名称                          | 数据类型                    | 数量  | 值            |
|---------------------|-------------------------------|-------------------------|-----|--------------|
| 处理软件版本号             | Version Of Software           | 8-bit signed char       | 不定长 |              |
| 处理软件更新日期            | Software 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 |
| 按照时、日、侯、旬、月合成的标志    | Time Of Data Composed         | 8-bit signed char       | 不定长 | XX mins      |
| 数据层数(表示数据有几个通道或几块等) | Number Of Data Level          | 16-bit unsigned Integer | 1   |              |
| 投影类型                | Projection Type               | 8-bit signed char       | 不定长 | None Project |
| 左上角X坐标              | Left-Top X                    | 32-bit floating point   | 1   | 经度或大地坐标X值    |
| 左上角Y坐标              | Left-Top Y                    | 32-bit floating point   | 1   | 纬度或大地坐标Y值    |
| 右上角X坐标              | Right-Top X                   | 32-bit floating point   | 1   | 经度或大地坐标X值    |
| 右上角Y坐标              | Right-Top Y                   | 32-bit floating point   | 1   | 纬度或大地坐标Y值    |
| 左下角X坐标              | Left-Bottom X                 | 32-bit floating point   | 1   | 经度或大地坐标X值    |
| 左下角Y坐标              | Left-Bottom Y                 | 32-bit floating point   | 1   | 纬度或大地坐标Y值    |
| 右下角X坐标              | Right-Bottom X                | 32-bit floating point   | 1   | 经度或大地坐标X值    |
| 右下角Y坐标              | Right-Bottom Y                | 32-bit floating point   | 1   | 纬度或大地坐标Y值    |
| 坐标单位                | Coordinate Unit               | 8-bit signed char       | 不定长 | Degree       |
| 投影中心纬度              | Projection Center Latitude    | 32-bit floating point   | 1   | 以度为单位        |
| 投影中心经度              | Projection Center Longitude   | 32-bit floating point   | 1   | 以度为单位        |
| 标准投影纬度1             | Standard Projection Latitude1 | 32-bit floating point   | 1   | 以度为单位        |
| 标准投影纬度2             | Standard Projection Latitude2 | 32-bit floating point   | 1   | 以度为单位        |
| 标准投影经度              | Standard Projection Longitude | 32-bit floating point   | 1   | 以度为单位        |

| 描述       | 属性名称                    | 数据类型                    | 数量  | 值           |
|----------|-------------------------|-------------------------|-----|-------------|
| 分辨率单位    | Unit Of Resolution      | 8-bit signed char       | 不定长 | Kilometer   |
| X方向分辨率   | Resolution X            | 32-bit floating point   | 1   | 经向分辨率       |
| Y方向分辨率   | Resolution Y            | 32-bit floating point   | 1   | 纬向分辨率       |
| 数据行数     | Data Lines              | 32-bit unsigned Integer | 1   | 1212        |
| 数据列数     | Data Pixels             | 32-bit unsigned Integer | 1   | 90          |
| 投影附加说明   | Projection Annotation   | 8-bit signed char       | 不定长 | 投影说明        |
| L1数据质量标记 | L1 Data Quality         | 8-bit signed char       | 不定长 |             |
| 数据质量标记   | Data Quality            | 8-bit unsigned Integer  | 1   |             |
| 数据质量标记说明 | Data Quality Annotation | 8-bit signed char       | 不定长 | 质量标记释义      |
| 产品责任人    | Product Creator         | 8-bit signed char       | 不定长 | Wuchunqiang |
| 程序编制者    | Programmer              | 8-bit signed char       | 不定长 |             |
| 文件的附加说明  | Additional Annotation   | 8-bit signed char       | 不定长 |             |

## 2.3 科学数据集

表5. MWTS/MWHS 融合大气温湿度廓线/稳定度指数/位势高度产品科学数据集（SDS）定义

| SDS1. | SDS 名称                               | 数据类型   | 维数       | 数据量(字节)                                                   |
|-------|--------------------------------------|--------|----------|-----------------------------------------------------------|
|       | MWTS_Scnlin<br>MWTS 扫描线号             | short  | [Nscans] | Nscans*2                                                  |
|       | SDS 属性名                              | 数据类型   | 数量       | 值                                                         |
|       | units                                | string | 1        | nan                                                       |
|       | valid_range                          | short  | 2        | [0,3000]                                                  |
|       | FillValue                            | short  | 1        | -32768                                                    |
|       | long_name                            | string | 1        | Scan line number                                          |
|       | Slope                                | float  | 1        | 1.0                                                       |
|       | Intercept                            | float  | 1        | 0.0                                                       |
|       | band_name                            | string | 1        |                                                           |
| SDS2. | SDS 名称                               | 数据类型   | 维数       | 数据量(字节)                                                   |
|       | MWTS_Scnlin_daycnt<br>MWTS 扫描线时间的天计数 | short  | [Nscans] | Nscans*2                                                  |
|       | SDS 属性名                              | 数据类型   | 数量       | 值                                                         |
|       | units                                | string | 1        | nan                                                       |
|       | valid_range                          | short  | 2        | [6100,13200]                                              |
|       | FillValue                            | short  | 1        | -32768                                                    |
|       | long_name                            | string | 1        | Day Count of Scan line Time                               |
|       | Slope                                | float  | 1        | 1.0                                                       |
|       | Intercept                            | float  | 1        | 0.0                                                       |
|       | band_name                            | string | 1        | Day count from 12:00 am, 2000.1.1, UTC for each scan line |

| SDS3. SDS 名称                         | 数据类型   | 维数          | 数据量(字节)                                |
|--------------------------------------|--------|-------------|----------------------------------------|
| MWTS_Scrlin_mscnt<br>MWTS 扫描线时间的毫秒计数 | int32  | [Nscans]    | Nscans*4                               |
| SDS 属性名                              | 数据类型   | 数量          | 值                                      |
| units                                | string | 1           | Dimensionless                          |
| valid_range                          | long   | 2           | [0,864000000]                          |
| FillValue                            | long   | 1           | -2147483648                            |
| long_name                            | string | 1           | Millisecond Count of Scan line<br>Time |
| Slope                                | float  | 1           | 1.0                                    |
| Intercept                            | float  | 1           | 0.0                                    |
| band_name                            | string | 1           |                                        |
| SDS4. SDS 名称                         | 数据类型   | 维数          | 数据量(字节)                                |
| Latitude<br>MWTS 像元的纬度               | float  | [Nscans,90] | Nscans*90*4                            |
| SDS 属性名                              | 数据类型   | 数量          | 值                                      |
| units                                | string | 1           | Degree                                 |
| valid_range                          | float  | 2           | [-90, 90]                              |
| FillValue                            | float  | 1           | -999999.99                             |
| long_name                            | string | 1           | MWTS pixel latitude                    |
| Slope                                | double | 1           | 1.0                                    |
| Intercept                            | double | 1           | 0.0                                    |
| band_name                            | string | 1           |                                        |
| SDS5. SDS 名称                         | 数据类型   | 维数          | 数据量(字节)                                |
| Longitude<br>MWTS 像元的经度              | float  | [Nscans,90] | Nscans*90*4                            |
| SDS 属性名                              | 数据类型   | 数量          | 值                                      |
| units                                | string | 1           | Degree                                 |
| valid_range                          | float  | 2           | [-180, 180]                            |
| FillValue                            | float  | 1           | -999999.99                             |
| long_name                            | string | 1           | MWTS pixel longitude                   |
| Slope                                | double | 1           | 1.0                                    |
| Intercept                            | double | 1           | 0.0                                    |
| band_name                            | string | 1           |                                        |
| SDS6. SDS 名称                         | 数据类型   | 维数          | 数据量(字节)                                |
| Sun_Zen_ang<br>太阳天顶角                 | float  | [Nscans,90] | Nscans*90*4                            |
| SDS 属性名                              | 数据类型   | 数量          | 值                                      |
| units                                | string | 1           | Degree                                 |
| valid_range                          | float  | 2           | [0,180]                                |
| FillValue                            | float  | 1           | -999999.99                             |
| long_name                            | string | 1           | Sun Zenith Angle                       |
| Slope                                | double | 1           | 1.0                                    |
| Intercept                            | double | 1           | 0.0                                    |
| band_name                            | string | 1           |                                        |
| SDS7. SDS 名称                         | 数据类型   | 维数          | 数据量(字节)                                |
| Sun_Amu_ang<br>太阳方位角                 | float  | [Nscans,90] | Nscans*90*4                            |
| SDS 属性名                              | 数据类型   | 数量          | 值                                      |
| units                                | string | 1           | Degree                                 |
| valid_range                          | float  | 2           | [0, 360]                               |
| FillValue                            | float  | 1           | -999999.99                             |
| long_name                            | string | 1           | Sun Azimuth Angle                      |

|               |                          |             |             |                                                               |
|---------------|--------------------------|-------------|-------------|---------------------------------------------------------------|
|               | Slope                    | double      | 1           | 1.0                                                           |
|               | Intercept                | double      | 1           | 0.0                                                           |
|               | band_name                | string      | 1           |                                                               |
| <b>SDS8.</b>  | <b>SDS 名称</b>            | <b>数据类型</b> | <b>维数</b>   | <b>数据量(字节)</b>                                                |
|               | Sat_Zen_ang<br>卫星天顶角     | float       | [Nscans,90] | Nscans*90*4                                                   |
|               | <b>SDS 属性名</b>           | <b>数据类型</b> | <b>数量</b>   | <b>值</b>                                                      |
|               | units                    | string      | 1           | Degree                                                        |
|               | valid_range              | float       | 2           | [0,180]                                                       |
|               | FillValue                | float       | 1           | -999999.99                                                    |
|               | long_name                | string      | 1           | Satellite Zenith Angle                                        |
|               | Slope                    | double      | 1           | 1.0                                                           |
|               | Intercept                | double      | 1           | 0.0                                                           |
|               | band_name                | string      | 1           |                                                               |
| <b>SDS9.</b>  | <b>SDS 名称</b>            | <b>数据类型</b> | <b>维数</b>   | <b>数据量(字节)</b>                                                |
|               | Sat_Amu_ang<br>卫星方位角     | float       | [Nscans,90] | Nscans*90*4                                                   |
|               | <b>SDS 属性名</b>           | <b>数据类型</b> | <b>数量</b>   | <b>值</b>                                                      |
|               | units                    | string      | 1           | Degree                                                        |
|               | valid_range              | float       | 2           | [0, 360]                                                      |
|               | FillValue                | float       | 1           | -999999.99                                                    |
|               | long_name                | string      | 1           | Satellite Azimuth Angle                                       |
|               | Slope                    | double      | 1           | 1.0                                                           |
|               | Intercept                | double      | 1           | 0.0                                                           |
|               | band_name                | string      | 1           |                                                               |
| <b>SDS10.</b> | <b>SDS 名称</b>            | <b>数据类型</b> | <b>维数</b>   | <b>数据量(字节)</b>                                                |
|               | Land_Sea_Mask<br>海陆掩码    | short       | [Nscans,90] | Nscans*90*2                                                   |
|               | <b>SDS 属性名</b>           | <b>数据类型</b> | <b>数量</b>   | <b>值</b>                                                      |
|               | units                    | string      | 1           | nan                                                           |
|               | valid_range              | short       | 2           | [0,7]                                                         |
|               | FillValue                | short       | 1           | -32768                                                        |
|               | long_name                | string      | 1           | Land sea Mask (1 land, 2 continentalwater, 3 sea, 5 boundary) |
|               | Slope                    | float       | 1           | 1.0                                                           |
|               | Intercept                | float       | 1           | 0.0                                                           |
|               | band_name                | string      | 1           |                                                               |
| <b>SDS11.</b> | <b>SDS 名称</b>            | <b>数据类型</b> | <b>维数</b>   | <b>数据量(字节)</b>                                                |
|               | DEM<br>地表高程数据            | short       | [Nscans,90] | Nscans*90*2                                                   |
|               | <b>SDS 属性名</b>           | <b>数据类型</b> | <b>数量</b>   | <b>值</b>                                                      |
|               | units                    | string      | 1           | m                                                             |
|               | valid_range              | short       | 2           | [-200,10000]                                                  |
|               | FillValue                | short       | 1           | -32768                                                        |
|               | long_name                | string      | 1           | Digital Elevation Model                                       |
|               | Slope                    | float       | 1           | 1.0                                                           |
|               | Intercept                | float       | 1           | 0.0                                                           |
|               | band_name                | string      | 1           |                                                               |
| <b>SDS12.</b> | <b>SDS 名称</b>            | <b>数据类型</b> | <b>维数</b>   | <b>数据量(字节)</b>                                                |
|               | Cloud<br>MWTS 视场的成像仪匹配云量 | float       | [Nscans,90] | Nscans*90*4                                                   |
|               | <b>SDS 属性名</b>           | <b>数据类型</b> | <b>数量</b>   | <b>值</b>                                                      |
|               | units                    | string      | 1           | Percent (%)                                                   |

|                                                      |             |                |                                                                                                                                     |
|------------------------------------------------------|-------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------|
| valid_range                                          | float       | 2              | [0.0,100.0]                                                                                                                         |
| FillValue                                            | float       | 1              | -999999.99                                                                                                                          |
| long_name                                            | string      | 1              | Cloud Percentage of MWTS Pixel                                                                                                      |
| Slope                                                | double      | 1              | 1.0                                                                                                                                 |
| Intercept                                            | double      | 1              | 0.0                                                                                                                                 |
| band_name                                            | string      | 1              |                                                                                                                                     |
| <b>SDS13. SDS 名称</b>                                 | <b>数据类型</b> | <b>维数</b>      | <b>数据量(字节)</b>                                                                                                                      |
| RAIN<br>MWTS 视场的降水检测                                 | float       | [Nscans,90]    | Nscans*90*4                                                                                                                         |
| <b>SDS 属性名</b>                                       | <b>数据类型</b> | <b>数量</b>      | <b>值</b>                                                                                                                            |
| units                                                | string      | 1              | Dimensionless                                                                                                                       |
| valid_range                                          | float       | 2              | [0,1.0]                                                                                                                             |
| FillValue                                            | float       | 1              | -999999.99                                                                                                                          |
| long_name                                            | string      | 1              | Oceanic Rain Screen of MWTS Pixel                                                                                                   |
| Slope                                                | double      | 1              | 1.0                                                                                                                                 |
| Intercept                                            | double      | 1              | 0.0                                                                                                                                 |
| band_name                                            | string      | 1              | -1: Land 0: non-rain over ice free ocean 1: rain over ice free ocean 5: non-rain over sea ice 9: rain over sea ice 9999: Fill Value |
| <b>SDS14. SDS 名称</b>                                 | <b>数据类型</b> | <b>维数</b>      | <b>数据量(字节)</b>                                                                                                                      |
| MWTS_Ch_BT<br>MWTS 通道亮温                              | float       | [Nscans,90,13] | Nscans*90*13*4                                                                                                                      |
| <b>SDS 属性名</b>                                       | <b>数据类型</b> | <b>数量</b>      | <b>值</b>                                                                                                                            |
| units                                                | string      | 1              | K                                                                                                                                   |
| valid_range                                          | float       | 2              | [150.0,350.0]                                                                                                                       |
| FillValue                                            | float       | 1              | -999999.99                                                                                                                          |
| long_name                                            | string      | 1              | MWTS Brightness Temperature                                                                                                         |
| Slope                                                | double      | 1              | 1.0                                                                                                                                 |
| Intercept                                            | double      | 1              | 0.0                                                                                                                                 |
| band_name                                            | string      | 1              | MWTS BT Channel 1-13                                                                                                                |
| <b>SDS15. SDS 名称</b>                                 | <b>数据类型</b> | <b>维数</b>      | <b>数据量(字节)</b>                                                                                                                      |
| MWHS_Ch_BT<br>MWHS 通道亮温                              | float       | [Nscans,90,15] | Nscans*90*15*4                                                                                                                      |
| <b>SDS 属性名</b>                                       | <b>数据类型</b> | <b>数量</b>      | <b>值</b>                                                                                                                            |
| units                                                | string      | 1              | K                                                                                                                                   |
| valid_range                                          | float       | 2              | [150.0,350.0]                                                                                                                       |
| FillValue                                            | float       | 1              | -999999.99                                                                                                                          |
| long_name                                            | string      | 1              | MWHS Brightness Temperature                                                                                                         |
| Slope                                                | double      | 1              | 1.0                                                                                                                                 |
| Intercept                                            | double      | 1              | 0.0                                                                                                                                 |
| band_name                                            | string      | 1              | MWHS Channel 1-15                                                                                                                   |
| <b>SDS16. SDS 名称</b>                                 | <b>数据类型</b> | <b>维数</b>      | <b>数据量(字节)</b>                                                                                                                      |
| TSHS_AT_Prof<br>TSHS 反演的大气温度廓线, 43 层, 1013.25-0.1hPa | float       | [Nscans,90,43] | Nscans*90*43*4                                                                                                                      |
| <b>SDS 属性名</b>                                       | <b>数据类型</b> | <b>数量</b>      | <b>值</b>                                                                                                                            |
| units                                                | string      | 1              | K                                                                                                                                   |
| valid_range                                          | float       | 2              | [150.0,400.0]                                                                                                                       |
| FillValue                                            | float       | 1              | -999999.99                                                                                                                          |
| long_name                                            | string      | 1              | Atmospheric temperature profile of TSHS                                                                                             |
| Slope                                                | double      | 1              | 1.0                                                                                                                                 |

|                                                         |             |                |                                         |
|---------------------------------------------------------|-------------|----------------|-----------------------------------------|
| Intercept                                               | double      | 1              | 0.0                                     |
| band_name                                               | string      | 1              | Atmospheric temperature level<br>01-43  |
| <b>SDS17. SDS 名称</b>                                    | <b>数据类型</b> | <b>维数</b>      | <b>数据量(字节)</b>                          |
| TSHS_AH_Prof<br>TSHS 反演的大气湿度廓线, 43<br>层, 1013.25-0.1hPa | float       | [Nscans,90,43] | Nscans*90*43*4                          |
| <b>SDS 属性名</b>                                          | <b>数据类型</b> | <b>数量</b>      | <b>值</b>                                |
| units                                                   | string      | 1              | Kg/kg                                   |
| valid_range                                             | float       | 2              | [0,0.05]                                |
| FillValue                                               | float       | 1              | -999999.99                              |
| long_name                                               | string      | 1              | Atmospheric humidity profile of<br>MWTS |
| Slope                                                   | double      | 1              | 1.0                                     |
| Intercept                                               | double      | 1              | 0.0                                     |
| band_name                                               | string      | 1              | Atmospheric humidity level 01-43        |
| <b>SDS18. SDS 名称</b>                                    | <b>数据类型</b> | <b>维数</b>      | <b>数据量(字节)</b>                          |
| TT<br>TT 指数                                             | float       | [Nscans,90]    | Nscans*90*4                             |
| <b>SDS 属性名</b>                                          | <b>数据类型</b> | <b>数量</b>      | <b>值</b>                                |
| units                                                   | string      | 1              | Dimensionless                           |
| valid_range                                             | float       | 2              | [-30.0,70.0]                            |
| FillValue                                               | float       | 1              | -999999.99                              |
| long_name                                               | string      | 1              | TT Index of MWTS Pixel                  |
| Slope                                                   | double      | 1              | 1.0                                     |
| Intercept                                               | double      | 1              | 0.0                                     |
| band_name                                               | string      | 1              |                                         |
| <b>SDS19. SDS 名称</b>                                    | <b>数据类型</b> | <b>维数</b>      | <b>数据量(字节)</b>                          |
| KI<br>K 指数                                              | float       | [Nscans,90]    | Nscans*90*4                             |
| <b>SDS 属性名</b>                                          | <b>数据类型</b> | <b>数量</b>      | <b>值</b>                                |
| units                                                   | string      | 1              | Dimensionless                           |
| valid_range                                             | float       | 2              | [-40.0,60.0]                            |
| FillValue                                               | float       | 1              | -999999.99                              |
| long_name                                               | string      | 1              | K Index of MWTS Pixel                   |
| Slope                                                   | double      | 1              | 1.0                                     |
| Intercept                                               | double      | 1              | 0.0                                     |
| band_name                                               | string      | 1              |                                         |
| <b>SDS20. SDS 名称</b>                                    | <b>数据类型</b> | <b>维数</b>      | <b>数据量(字节)</b>                          |
| SI<br>SI 指数                                             | float       | [Nscans,90]    | Nscans*90*4                             |
| <b>SDS 属性名</b>                                          | <b>数据类型</b> | <b>数量</b>      | <b>值</b>                                |
| units                                                   | string      | 1              | Dimensionless                           |
| valid_range                                             | float       | 2              | [-8.0,20.0]                             |
| FillValue                                               | float       | 1              | -999999.99                              |
| long_name                                               | string      | 1              | Showalter index of MWTS Pixel           |
| Slope                                                   | double      | 1              | 1.0                                     |
| Intercept                                               | double      | 1              | 0.0                                     |
| band_name                                               | string      | 1              |                                         |
| <b>SDS21. SDS 名称</b>                                    | <b>数据类型</b> | <b>维数</b>      | <b>数据量(字节)</b>                          |
| LI<br>抬升指数                                              | float       | [Nscans,90]    | Nscans*90*4                             |
| <b>SDS 属性名</b>                                          | <b>数据类型</b> | <b>数量</b>      | <b>值</b>                                |

|                               |             |                |                                            |
|-------------------------------|-------------|----------------|--------------------------------------------|
| units                         | string      | 1              | Dimensionless                              |
| valid_range                   | float       | 2              | [-20.0,40.0]                               |
| FillValue                     | float       | 1              | -999999.99                                 |
| long_name                     | string      | 1              | Lifted index of MWTs Pixel                 |
| Slope                         | double      | 1              | 1.0                                        |
| Intercept                     | double      | 1              | 0.0                                        |
| band_name                     | string      | 1              |                                            |
| <b>SDS22. SDS 名称</b>          | <b>数据类型</b> | <b>维数</b>      | <b>数据量(字节)</b>                             |
| Geo_Hht<br>位势高度               | float       | [Nscans,90]    | 1212*90*4                                  |
| <b>SDS 属性名</b>                | <b>数据类型</b> | <b>数量</b>      | <b>值</b>                                   |
| units                         | string      | 1              | Dimensionless                              |
| valid_range                   | float       | 2              | [0.0,200000.0]                             |
| FillValue                     | float       | 1              | -999999.99                                 |
| long_name                     | string      | 1              | Geo_Height of MWTs Pixel                   |
| Slope                         | double      | 1              | 1.0                                        |
| Intercept                     | double      | 1              | 0.0                                        |
| band_name                     | string      | 1              |                                            |
| <b>SDS23. SDS 名称</b>          | <b>数据类型</b> | <b>维数</b>      | <b>数据量(字节)</b>                             |
| NWP_ATProf<br>插值的 NWP 大气温度廓线  | float       | [Nscans,90,43] | Nscans*90*43*4                             |
| <b>SDS 属性名</b>                | <b>数据类型</b> | <b>数量</b>      | <b>值</b>                                   |
| units                         | string      | 1              | K                                          |
| valid_range                   | float       | 2              | [150.0, 400.0]                             |
| FillValue                     | float       | 1              | -999999.99                                 |
| long_name                     | string      | 1              | NWP_AIR Temperature Profile                |
| Slope                         | double      | 1              | 1.0                                        |
| Intercept                     | double      | 1              | 0.0                                        |
| band_name                     | string      | 1              | NWP Atmospheric temperature<br>level 01-43 |
| <b>SDS24. SDS 名称</b>          | <b>数据类型</b> | <b>维数</b>      | <b>数据量(字节)</b>                             |
| NWP_AHProf<br>插值的 NWP 大气湿度廓线  | float       | [Nscans,90,43] | Nscans*90*43*4                             |
| <b>SDS 属性名</b>                | <b>数据类型</b> | <b>数量</b>      | <b>值</b>                                   |
| units                         | string      | 1              | Kg/kg                                      |
| valid_range                   | float       | 2              | [0, 0.05]                                  |
| FillValue                     | float       | 1              | -999999.99                                 |
| long_name                     | string      | 1              | T639_AHProf                                |
| Slope                         | double      | 1              | 1.0                                        |
| Intercept                     | double      | 1              | 0.0                                        |
| band_name                     | string      | 1              | NWP Atmospheric humidity level<br>01-43    |
| <b>SDS25. SDS 名称</b>          | <b>数据类型</b> | <b>维数</b>      | <b>数据量(字节)</b>                             |
| NWP_Surf_Pres<br>插值的 NWP 表面气压 | float       | [Nscans,90]    | Nscans*90*4                                |
| <b>SDS 属性名</b>                | <b>数据类型</b> | <b>数量</b>      | <b>值</b>                                   |
| units                         | string      | 1              | hPa                                        |
| valid_range                   | float       | 2              | [400.0,1100.0]                             |
| FillValue                     | float       | 1              | -999999.99                                 |
| long_name                     | string      | 1              | NWP Surface Pressure                       |
| Slope                         | float       | 1              | 1.0                                        |
| Intercept                     | float       | 1              | 0.0                                        |
| band_name                     | string      | 1              |                                            |

| SDS26. SDS 名称                    | 数据类型   | 维数          | 数据量(字节)                                               |
|----------------------------------|--------|-------------|-------------------------------------------------------|
| NWP_Surf_Temp<br>插值的 NWP 2m 气温   | float  | [Nscans,90] | Nscans*90*4                                           |
| SDS 属性名                          | 数据类型   | 数量          | 值                                                     |
| units                            | string | 1           | K                                                     |
| valid_range                      | float  | 2           | [150.0,400.0]                                         |
| FillValue                        | float  | 1           | -999999.99                                            |
| long_name                        | string | 1           | NWP Surface Air Temperature                           |
| Slope                            | double | 1           | 1.0                                                   |
| Intercept                        | double | 1           | 0.0                                                   |
| band_name                        | string | 1           |                                                       |
| SDS27. SDS 名称                    | 数据类型   | 维数          | 数据量(字节)                                               |
| NWP_Surf_Wv<br>插值的 NWP 2m 湿度     | float  | [Nscans,90] | Nscans*90*4                                           |
| SDS 属性名                          | 数据类型   | 数量          | 值                                                     |
| units                            | string | 1           | Kg/kg                                                 |
| valid_range                      | float  | 2           | [0,0.05]                                              |
| FillValue                        | float  | 1           | -999999.99                                            |
| long_name                        | string | 1           | NWP Surface Air Humidity                              |
| Slope                            | double | 1           | 1.0                                                   |
| Intercept                        | double | 1           | 0.0                                                   |
| band_name                        | string | 1           |                                                       |
| SDS28. SDS 名称                    | 数据类型   | 维数          | 数据量(字节)                                               |
| NWP_Skin_Temp<br>插值的 NWP 表皮温度    | float  | [Nscans,90] | Nscans*90*4                                           |
| SDS 属性名                          | 数据类型   | 数量          | 值                                                     |
| units                            | string | 1           | K                                                     |
| valid_range                      | float  | 2           | [150.0,400.0]                                         |
| FillValue                        | float  | 1           | -999999.99                                            |
| long_name                        | string | 1           | NWP Surface Skin Temperature                          |
| Slope                            | double | 1           | 1.0                                                   |
| Intercept                        | double | 1           | 0.0                                                   |
| band_name                        | string | 1           |                                                       |
| SDS29. SDS 名称                    | 数据类型   | 维数          | 数据量(字节)                                               |
| NWP_Surf_Wind<br>插值的 NWP 10m 风向量 | float  | [Nscans,90] | Nscans*90*4                                           |
| SDS 属性名                          | 数据类型   | 数量          | 值                                                     |
| units                            | string | 1           | m/s                                                   |
| valid_range                      | float  | 2           | [0.0,100.0]                                           |
| FillValue                        | float  | 1           | -999999.99                                            |
| long_name                        | string | 1           | NWP Surface zonal Wind NWP<br>Surface meridional Wind |
| Slope                            | double | 1           | 1.0                                                   |
| Intercept                        | double | 1           | 0.0                                                   |
| band_name                        | string | 1           |                                                       |
| SDS30. SDS 名称                    | 数据类型   | 维数          | 数据量(字节)                                               |
| Qa_Flag_MWTS<br>MWTS 亮温质量标识      | short  | [Nscans,90] | Nscans*90*2                                           |
| SDS 属性名                          | 数据类型   | 数量          | 值                                                     |
| units                            | string | 1           | nan                                                   |
| valid_range                      | short  | 2           | [0,1]                                                 |
| FillValue                        | short  | 1           | -32768                                                |
| long_name                        | string | 1           | MWTS OBS Quality Flag 0 for                           |

|                              |             |             |                                                                 |
|------------------------------|-------------|-------------|-----------------------------------------------------------------|
|                              |             |             | good; 1 for invalid                                             |
| Slope                        | float       | 1           | 1.0                                                             |
| Intercept                    | float       | 1           | 0.0                                                             |
| band_name                    | string      | 1           |                                                                 |
| <b>SDS31. SDS 名称</b>         | <b>数据类型</b> | <b>维数</b>   | <b>数据量(字节)</b>                                                  |
| Qa_Flag_MWHS<br>MWHS 亮温质量标识  | short       | [Nscans,90] | Nscans*90*2                                                     |
| <b>SDS 属性名</b>               | <b>数据类型</b> | <b>数量</b>   | <b>值</b>                                                        |
| units                        | string      | 1           | nan                                                             |
| valid_range                  | short       | 2           | [0,1]                                                           |
| FillValue                    | short       | 1           | -32768                                                          |
| long_name                    | string      | 1           | MWHS OBS Quality Flag 0 for good; 1 for invalid                 |
| Slope                        | float       | 1           | 1.0                                                             |
| Intercept                    | float       | 1           | 0.0                                                             |
| band_name                    | string      | 1           |                                                                 |
| <b>SDS32. SDS 名称</b>         | <b>数据类型</b> | <b>维数</b>   | <b>数据量(字节)</b>                                                  |
| Qa_Flag_Cloud<br>匹配云量质量标识    | short       | [Nscans,90] | Nscans*90*2                                                     |
| <b>SDS 属性名</b>               | <b>数据类型</b> | <b>数量</b>   | <b>值</b>                                                        |
| units                        | string      | 1           | nan                                                             |
| valid_range                  | short       | 2           | [0,1]                                                           |
| FillValue                    | short       | 1           | -32768                                                          |
| long_name                    | string      | 1           | Collocated Cloud Amount Quality Flag. 0 for good; 1 for invalid |
| Slope                        | float       | 1           | 1.0                                                             |
| Intercept                    | float       | 1           | 0.0                                                             |
| band_name                    | string      | 1           |                                                                 |
| <b>SDS33. SDS 名称</b>         | <b>数据类型</b> | <b>维数</b>   | <b>数据量(字节)</b>                                                  |
| Qa_Flag_Rain<br>匹配降水检测质量标识   | short       | [Nscans,90] | Nscans*90*2                                                     |
| <b>SDS 属性名</b>               | <b>数据类型</b> | <b>数量</b>   | <b>值</b>                                                        |
| units                        | string      | 1           | nan                                                             |
| valid_range                  | short       | 2           | [0,1]                                                           |
| FillValue                    | short       | 1           | -32768                                                          |
| long_name                    | string      | 1           | Collocated Rain Quality Flag. 0 for good; 1 for invalid         |
| Slope                        | float       | 1           | 1.0                                                             |
| Intercept                    | float       | 1           | 0.0                                                             |
| band_name                    | string      | 1           |                                                                 |
| <b>SDS34. SDS 名称</b>         | <b>数据类型</b> | <b>维数</b>   | <b>数据量(字节)</b>                                                  |
| Qa_Flag_AVP<br>TSHS 反演产品质量标识 | short       | [Nscans,90] | Nscans*90*2                                                     |
| <b>SDS 属性名</b>               | <b>数据类型</b> | <b>数量</b>   | <b>值</b>                                                        |
| units                        | string      | 1           | nan                                                             |
| valid_range                  | short       | 2           | [0,1]                                                           |
| FillValue                    | short       | 1           | -32768                                                          |
| long_name                    | string      | 1           | TSHS AVP QualityFlag; 1 for invalid                             |
| Slope                        | float       | 1           | 1.0                                                             |
| Intercept                    | float       | 1           | 0.0                                                             |
| band_name                    | string      | 1           |                                                                 |
| <b>SDS35. SDS 名称</b>         | <b>数据类型</b> | <b>维数</b>   | <b>数据量(字节)</b>                                                  |
| Pressure                     | float       | [43]        | 43*4                                                            |

|                       |             |             |                                      |
|-----------------------|-------------|-------------|--------------------------------------|
| 大气廓线气压坐标              |             |             |                                      |
| <b>SDS 属性名</b>        | <b>数据类型</b> | <b>数量</b>   | <b>值</b>                             |
| units                 | string      | 1           | hPa                                  |
| valid_range           | float       | 2           | [0.0, 1200.0]                        |
| FillValue             | float       | 1           | -999999.99                           |
| long_name             | string      | 1           | Vertical Axis of Atmospheric profile |
| Slope                 | double      | 1           | 1.0                                  |
| Intercept             | double      | 1           | 0.0                                  |
| band_name             | string      | 1           |                                      |
| <b>SDS36. SDS 名称</b>  | <b>数据类型</b> | <b>维数</b>   | <b>数据量(字节)</b>                       |
| Scatter Index<br>散射指数 | float       | [Nscans,90] | 4                                    |
| <b>SDS 属性名</b>        | <b>数据类型</b> | <b>数量</b>   | <b>值</b>                             |
| units                 | string      | 1           |                                      |
| valid_range           | short       | 2           | [-200.0,100.0]                       |
| FillValue             | short       | 1           | -999999.99                           |
| long_name             | string      | 1           | Scatter Index                        |
| Slope                 | float       | 1           | 1.0                                  |
| Intercept             | float       | 1           | 0.0                                  |
| band_name             | string      | 1           |                                      |
| <b>SDS37. SDS 名称</b>  | <b>数据类型</b> | <b>维数</b>   | <b>数据量(字节)</b>                       |
| Sea Ice<br>海冰标识       | short       | [Nscans,90] |                                      |
| <b>SDS 属性名</b>        | <b>数据类型</b> | <b>数量</b>   | <b>值</b>                             |
| units                 | string      | 1           | %                                    |
| valid_range           | short       | 2           | [0.100]                              |
| FillValue             | short       | 1           | -999999                              |
| long_name             | string      | 1           | Sea ice concentration                |
| Slope                 | float       | 1           | 1                                    |
| Intercept             | float       | 1           | 0                                    |
| band_name             | string      | 1           |                                      |
| <b>SDS38. SDS 名称</b>  | <b>数据类型</b> | <b>维数</b>   | <b>数据量(字节)</b>                       |
| TOTO3<br>臭氧含量         | float       | [Nscans,90] |                                      |
| <b>SDS 属性名</b>        | <b>数据类型</b> | <b>数量</b>   | <b>值</b>                             |
| units                 | string      | 1           | nan                                  |
| valid_range           | short       | 2           | [0,1000.0]                           |
| FillValue             | short       | 1           | -999999.99                           |
| long_name             | string      | 1           | Total ozone amount of MWTS<br>Pixel  |
| Slope                 | float       | 1           | 1.0                                  |
| Intercept             | float       | 1           | 0.0                                  |
| band_name             | string      | 1           | NANA                                 |

2.4 表格数据

表6. MWTS/MWHS 融合大气温湿度廓线/稳定度指数/位势高度产品表格数据（Vdata）定义

|  |  |
|--|--|
|  |  |
|--|--|

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### 3 备忘录

表7. 更新备忘录

| 版本号 | 日期 | 修改者 | 修 改 描 述 |
|-----|----|-----|---------|
|     |    |     |         |