Read-me for Data Users

MEMORANDUM FOR: The JPSS Program Record
SUBMITTED BY: JPSS MiRS Products Team Lead, Quanhua (Mark) Liu
CONCURRED BY: JPSS Algorithm Management Project Lead Arron Layns
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APPROVED BY: JPSS Program Scientist Mitch Goldberg

LAYNS.ARRON.LOUISE.1376452367 Digitally signed by LAYNS.ARRON.LOUISE.1376452367 Date: 2018.05.23 09:13:04 -06'00'
ZHOU.LIHANG.1385204074 Digitally signed by ZHOU.LIHANG.1385204074 Date: 2018.05.23 12:27:34 -04'00'
Mitch Goldberg Digitally signed by Mitch Goldberg DN: cn=Mitch Goldberg, o=JPSS, ou=NOAA /NESDIS, email=Mitch.Goldberg@noaa.gov, c=US Date: 2018.05.24 14:17:52 -04'00'

SUBJECT: MiRS Product Beta maturity status
DATE: 03/21/2018

Beta maturity status declaration for MiRS Retrieval Products
Maturity Review Date: 03/21/2018
Effective Date: 11/29/2017

The Joint Polar Satellite System-1 (JPSS-1) was successfully launched on November 18, 2017 and renamed NOAA-20 after reaching polar orbit. Eleven days after launch, on November 28, 2017, the NOAA-20 Advanced Technology Microwave Sounder (ATMS) was activated and started to collect science data. Like the Suomi NPP ATMS, NOAA-20 ATMS is a cross-track scanning radiometer with 22 channels at frequencies ranging from 23 to 183 GHz, permitting the measurements of atmospheric temperature and moisture profiles under most weather conditions.

The Microwave Integrated Retrieval System (MiRS) science team started offline processing of the MiRS products once ATMS SDR data were made available. Based on the evaluation presented, the science team recommends the NOAA-20 MiRS product is now considered to have Beta maturity level quality as of 11/29/2017 (effective date).

1. **Maturity stage definition**:
   The Definition of Beta maturity stage is available at the JPSS Algorithm Maturity Matrix webpage:
   http://www.star.nesdis.noaa.gov/jpss/AlgorithmMaturity.php

2. **Algorithm Description**:

   List of Products (Collection Short Name (CSN)): NDE_L2_MIRS
   - Moisture Profile
   - Temperature Profile
   - Rainfall Rate
   - Total Precipitable Water
   - Land Surface Emissivity
   - Land Surface Temperature
   - Cloud Liquid Water
   - Sea Ice Concentration
   - Snow Cover/Depth
   - Snow-Water Equivalent

Product requirements/Exclusions (L1RDS):
The current version of the Joint Polar Satellite System (JPSS) Level 1 Requirements Supplement (L1RDS) is available at http://www.jpss.noaa.gov/technical_documents.html.

Quality flags:
MiRS Quality Flags

- Top level QC: 0=good, 1="some event", 2=bad
- Lower level QC: bitwise packed for multiple conditions (e.g. precipitation, RH saturation, T inversion, etc.)
- Normally sufficient to utilize top level QC flag, along with geophysical situation for filtering (i.e. for valid T and WV in non-rainy conditions select all points where QC< 2 .and. RR=0)

Product evaluation/validation:
See presentation

Product availability/reliability:
Offline MiRS EDR products from NOAA-20/ATMS have been produced in STAR since 29 November 2017 (L+11 days). All initial validation (comparisons with ECMWF and GDAS analyses) and comparisons with SNPP/ATMS products show very stable performance and high consistency with SNPP/ATMS products.

Algorithm performance dependence:
Algorithm performance dependent on ATMS TDR data quality.

Known errors/issues/limitations:
Quantitative validation primarily done for temperature, water vapor and TPW only for the period November 2017-March 2018. Qualitative validation (collocations with MiRS SNPP/ATMS products) primarily done for temperature, water vapor, TPW, sea ice concentration and snow water equivalent. Additional qualitative comparisons with SNPP/ATMS for rain rate, rain water path, graupel water path and cloud liquid water all show close agreement. Radiometric bias corrections have not been optimized for NOAA-20. Updated radiometric biases will be generated and tested for delivery in late 2018.

3. **Changes since last maturity stage**:
   N/A

4. **Review board recommendations**:
   N/A

5. **Path Forward/Future Plan**:

Updated radiometric bias corrections trained on data from a full 12-month annual cycle, and integration of a Snowfall Rate (SFR) algorithm for both SNPP and NOAA-20. Validation activities are continuing.

Additional information is available in the MiRS algorithm theoretical basis document (ATBD) and validation maturity review briefing, which can be accessed at:

http://www.star.nesdis.noaa.gov/jpss/Docs.php

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