MIRS Delivery Memorandum Version 11.2

Date of Release:

August 30th 2016

Purpose of Delivery:

This delivery constitutes the official MIRS delivery algorithm package (DAP11.2) to NOAA/NESDIS/OSPO from NOAA/NESDIS/STAR.

IMPORTANT: **This delivery is to be used for operational processing of the sensors listed in the next section "Brief Description of the Package". Please note that this does not include capability for Megha-Tropiques/SAPHIR microwave sensor data. Users requiring processing of SAPHIR data should continue to use the package released in March 2014, (DAP10.0) which has capability exclusively to process SAPHIR. A fully integrated DAP which combines SAPHIR capability with that for all other operational sensors will be delivered at a future date.**

Brief Description of the Package:

This MIRS package contains all source codes, scripts, makefiles, data, coefficients, etc. needed to run the MIRS package for the following operational satellites: NOAA-18, NOAA-19, METOP-A, METOP-B, DMSP-F17, DMSP-F18, S-NPP, and GPM. Note that the variational retrieval is sensor-independent and could be run for any other microwave sensor. The same observation applies to the forward operator and other sensor-independent applications. The testing was performed under a Linux environment using both ifort and gfortran Fortran compilers.

The package also contains more limited (research) capability to process the following satellites/sensors: TRMM/TMI, GCOM-W1/AMSR2, and AQUA/AMSRE. **However, the retrieval products from these sensors have not been subjected to extensive validation, are not officially operational, and should be used for research purposes only. Please contact the MiRS team with any questions concerning the processing of these data, or before presenting any results to the community.**

List of Delivery Contents:

(1) Source codes, (2) Scripts, (3) Configuration files, (4) Makefiles, (5) Coefficients, (6) Sample data, (7) Documentation, (8) Version 2.1.1 of the CRTM forward model package, (9) Benchmark files for verification, (10) GUI-based tool to control MIRS execution, (11) A complete *readme* file

Version Number

The Subversion version number of this delivery is contained in the name of the DAP tar file.

Officially Delivered Products

The MiRS always produces all core and derived products by design. However, depending on the information content of the particular sensor measurements, only certain retrieved products, resulting from either the core retrieval or the post-processing algorithm, may be of operational quality. The officially delivered products with this delivery are the following:

For Suomi-NPP, NOAA-18, NOAA-19, METOP-A, METOP-B:

- Temperature profile over open water ocean
- Humidity profile over open water ocean
- Humidity Profile over non-coastal Land
- Total Precipitable Water (TPW) over open water ocean
- Total Precipitable Water over non-coastal land
- Land surface temperature

- Surface Emissivity over land and snow
- Surface Type Classification
- Snow Water Equivalent (SWE)
- Sea Ice Concentration (SIC)
- Snow Cover Extent (SCE), based on the SWE
- Vertically-Integrated Non-precipitating Cloud Liquid Water (CLW) over open water ocean
- Vertically-Integrated Ice Water Path (IWP)
- Vertically-Integrated Rain Water Path (RWP)
- Rainfall Rate (RR) over open water ocean and non-coastal, non-snow-covered land surface types
- Effective grain size of snow (over snow-covered land surface)*
- Multi-Year (MY) Type Sea Ice Concentration*
- First-Year (FY) Type Sea Ice Concentration*
- Snow fall rate (SFR)

*Note that FY and MY Sea Ice Concentration, as well as Snow Grain Size are not officially operational, but preliminary products, which is a higher maturity level than experimental status.

The following products are also produced experimentally for NOAA-18, NOAA-19, Metop-A, Metop-B, and Suomi-NPP. Note that they lack a thorough validation due to the absence of reliable ground truth measurements. These are made available to users for the purpose of evaluating their usefulness.

- Cloud Liquid Water Profile (CLWP) over ocean.
- Surface Temperature (skin) extended to snow-covered land surface type
- Surface Temperature (skin) extended to open ocean water

For DMSP-F17 and DMSP-F18:

- Temperature profile over open water ocean
- Humidity profile over open water ocean
- Total Precipitable Water (TPW) over open water ocean
- Total Precipitable Water over non-coastal land
- Land surface temperature
- Surface Emissivity over land and snow
- Surface Type Classification
- Snow Water Equivalent (SWE)
- Sea Ice Concentration (SIC)
- Snow Cover Extent (SCE), based on the SWE
- Vertically-Integrated Non-precipitating Cloud Liquid Water (CLW) over open water ocean
- Vertically-Integrated Ice Water Path (IWP)
- Vertically-Integrated Rain Water Path (RWP)
- Rainfall Rate (RR) over open water ocean and non-coastal, non-snow-covered land surface types
- Effective grain size of snow (over snow-covered land surface)*
- Multi-Year (MY) Type Sea Ice Concentration*
- First-Year (FY) Type Sea Ice Concentration*

*Note that FY and MY Sea Ice Concentration, as well as Snow Grain Size are not officially operational, but preliminary products, which is a higher maturity level than experimental status.

The following products are also produced experimentally for SSMI/S. These are made available to users for the purpose of evaluating their usefulness.

- Cloud Liquid Water Profile (CLWP) over ocean

For GPM:

- Total Precipitable Water (TPW) over open water ocean
- Total Precipitable Water over non-coastal land
- Surface Type Classification
- Snow Water Equivalent (SWE)
- Snow Cover Extent (SCE), based on the SWE

- Vertically-Integrated Non-precipitating Cloud Liquid Water (CLW) over open water ocean
- Vertically-Integrated Ice Water Path (IWP)
- Vertically-Integrated Rain Water Path (RWP)
- Rainfall Rate (RR) over open water ocean and non-coastal, non-snow-covered land surface types

Summary of Changes Made since Last Delivery:

The list below is an overview of all technical, scientific and other changes made to MIRS since the last official delivery (DAP11.1) which occurred in September 2015.

Scientific changes:

- Extension of operational capability to GPM/GMI sensor data

MIRS Design & Development Team

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Point of Contact:

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