



Read-me for Data Users

MEMORANDUM FOR: The JPSS Program Record
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SUBJECT: NOAA-21 SFR Beta maturity status
DATE: 04/27/2023

Beat maturity status declaration for NOAA-21 SFR

Maturity Review Date: 04/26/2023
Effective Date: 12/03/2022
Operational System: NCCF, SFR 1.0

The JPSS Algorithm Maturity Readiness Review Board approved the release of the NOAA-21 Snowfall Rate (SFR) to the {public} with a Beta maturity level quality as of 12/03/2022 (effective date), based on JPSS Validation Maturity Review held on 04/26/2023 (link to review artifacts).

1. **Maturity stage definition** (reference to the AMM webpage for maturity definition: <http://www.star.nesdis.noaa.gov/jpss/AlgorithmMaturity.php>). Beta maturity means that the product meets the following criteria:
 - Product is minimally validated, and may still contain significant identified and unidentified errors.
 - Information/data from validation efforts can be used to make initial qualitative or very limited quantitative assessments regarding product fitness-for-purpose.
 - Documentation of product performance and identified product performance anomalies, including recommended remediation strategies, exist.
2. **Algorithm Description:**
 - List of Products** (Collection Short Name (CSN))
ATMS Snowfall Rate (SFR)
 - Product requirements/Exclusions** (DPS)
The SFR requirements are documented in the [Joint Polar Satellite System \(JPSS\) Ground Segment Data Product Specification \(GSegDPS\)](#). Specifically, there are three product requirements:
DPS-1756: The algorithm shall produce a SFR product that has a measurement precision of: 1.0 mm/hr.
DPS-1757: The algorithm shall produce a SFR product that has a measurement accuracy of: ± 0.3 mm/hr.

Quality flags (Table)

There is one quality flag (32 bit) in the SFR file that specifies two quality variables:

Quality flag bit	Meaning	Value
0	1DVAR Convergence	1: Non-convergent 0: Convergent
1	SFR threshold	1: SFR is below threshold, set to 0 0: SFR is above threshold, value unchanged

Product evaluation/validation

The NOAA-21 SFR provides water equivalent snowfall amount in unit time. A preliminary validation study has been conducted using 1-month of data and compared NOAA-21 and NOAA-20 SFR both on daily and monthly scales. The two products are highly consistent both qualitatively and quantitatively. However, further algorithm development is required once more snowfall data becomes available, and more comprehensive validation study needs to be conducted to evaluate the quality of the NOAA-21 SFR product.

Product availability/reliability

The NOAA-21 SFR is currently at the Beta maturity stage prior to full production. Limited data is available since 02/07/2023. The product is scheduled for operational production in NCCF in late 2023 or early 2024. Once the operational phase begins, the product will be available at NOAA CLASS:

<https://www.avl.class.noaa.gov/saa/products/welcome>

Algorithm performance dependence

The performance of the NOAA-21 SFR product largely depends on the quality of the NOAA-21 ATMS TDR data and the NOAA GFS model forecasts. The NOAA-21 TDR data have reached validated maturity. Additional information is available in the ATMS SFR algorithm theoretical basis document (ATBD) and Beta maturity review briefing.

Known errors/issues/limitations

Only preliminary algorithm development has been performed due to the limitation of available snowfall data. Additional data is required to conduct full algorithm development including training machine learning models. As such, the current NOAA-21 SFR product is only at the Beta maturity level and may still contain significant identified and unidentified errors.

3. Changes since last maturity stage

N/A

4. Review board recommendations

TBD

5. Path Forward/Future Plan

The NOAA-21 SFR Provisional review is scheduled for February 2024. Prior to the review, the SFR team will continue to collect snowfall data, develop snowfall detection and snowfall rate algorithms including training several machine learning models, and conduct cal/val activities. Once the product reaches Provisional maturity, it will be transitioned to NESDIS operation.

6. Additional Items to note

After the NOAA-21 SFR reaches Beta maturity and by the next snow season, the SFR team will start processing the product in near real-time and post product images on its [website](#) for users to access. The



Read-me for Data Users

product will also be added to the ongoing data distribution to some NWS Weather Forecast Offices for evaluation.

Additional information is available in the SFR 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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