

NOAA-20 Algorithm Maturity Review

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Review Team Members: Mitch Goldberg (chair), Lihang Zhou, Satya Kalluri, Ingrid Guch, Banghua Yan, Jim Yoe, Kevin Schrab, Rick Stumpf, Michael Ford, Gary Wick, Tom Renkevans, Jim Gleason

Summary

The NOAA Unique Combined Atmospheric Processing System (NUCAPS) team did an excellent job presenting N20 NUCAPS' Cal Val results. The review panel recommends the following:

- NUCAPS Atmospheric Vertical Temperature Profile (AVTP), Atmospheric Vertical Moisture Profile (AVMP), Ozone, Outgoing Longwave Radiation (OLR), and NUCAPS Carbon Monoxide (CO) product have reached Validated Maturity
- NUCAPS CH4 product have reached Provisional Maturity

NUCAPS EDR Products

NOAA-20 NUCAPS products: AVTP, AVMP, Ozone

The NUCAPS team demonstrated that the Atmospheric Temperature, Moisture, and Ozone products meeting the spec. The results comparing with ECMWF and radiosondes showed good quantitative comparisons globally. The results from NOAA-20 and SNPP are in excellent agreement. The presentation did not fully demonstrate the long term stability of the product performance during the review meeting (See RFA-1 below). The supplement material submitted by the NUCAPS team after the review has addressed this action from the review team, the RFA-1 is now closed and the review team recommends the AVTP, AVMP, and Ozone reached Validated Maturity. Some further comments:

Slide 6: NUCAPS products, Mitch recommended to differentiate the products that are generated operationally and produced offline. The SO2 flags should be added to NUCAPS-CrIS, similar to the current IASI operational products.

A minor comment to the team: In future, to ensure the version number used for the NUCAPS to be consistent with the version control standard for enterprise algorithms.

RFA-1: In order to fully demonstrate the validated maturity, the review team suggested to add the time series of statistics; or statistics for multiple focus days throughout different months of the year. (Closed)

RFA-2: MW-NUCAPS retrieval showed deviation from the microwave spec; recommend the team to address the MW-NUCAPS performance in the next stage and give updates on the coming annual science team meeting 2020 and provide some comparisons with MiRS temperature and water vapor profile products.

RFA-3: To check the output files from CrIS are ensure consistent with those from IASI; especially files such as global grids, PCS files, etc., and report back to the review team when those files can be generated from CrIS.

OLR, CO, CH4:

OLR presentation demonstrated much progress for OLR validation since the previous review. NOAA-20 (as well as SNPP) CrIS OLR and AQUA CERES OLR comparisons showed remarkably consistency. Multiple focus days over different months across the year for comparisons showing meeting specs, with stable performance statistics. Recommend OLR reached Validated Maturity.

Slide 73-74: The difference between the CERES vs N20 could be due to the time difference; suggest the team to look into and do some analysis, e.g. screen out the samples have larger time differences.

Recommend to analysis the difference between the low/high resolutions OLR; over time.

For CO: Team made great progress on extending the validation data source for CO validation, such as Atmospheric Tomography Mission (ATom); AirCore; and Total Carbon Column Observing Network (TCCON). CO from NUCAPS demonstrated good comparisons between NOAA-20 and SNPP, as well as those from CAMS, TROPOMI, MOPPIT, and AIRS CO. The validation results of CO against TCCON and ATom showed the performance meeting the spec for accuracy and precision. The long term trends seem to be consistent with the other sources. The validation results demonstrated that the CO reached validated maturity.

For CH4: Team showed good comparisons for NOAA-20 and SNPP; and with AIRS, CAMS CH4. Recommended the team to produce difference maps for the monthly before the Validated Maturity; CH4 validation against reference data demonstrated meeting the accuracy spec. CH4 demonstrated the Provisional Maturity.

For CO2: CO2 still needs more work as the team planned, before reaching Provisional (expect to be Feb 2020). Slide 100: suggest to look into the regions with high values/signals for CO2 and see if they are real features or artifacts. CO2 remains Beta maturity.