**NOAA-20 Algorithm Maturity Review**
**July 17, 2020**

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

**Summary**
The review team acknowledges the NOAA Ocean Color science team members for their excellent efforts and hard work in preparing for this review and the progress made calibrating/validating the NOAA-20 Ocean Color products. The review team recommends NOAA-20 Ocean Color Environment Data Records (EDRs) reached Validated Maturity. The review team requests the Ocean Color team to address the Requested for Actions (RFAs) and provide the updates back to the review team before September 30th 2020, to close these actions.

**Ocean Color Products**

The team did a great job presenting the N20 cal val results. The global and regional statistics compared with the validation data sets showed excellent performance of the Ocean Color products. The team also demonstrated that the N20 and SNPP ocean color products are in good agreement. On slide 10 it showed some spikes of products before April 27 2018, due to the post launch VIIRS SDR updates still undergoing. The team demonstrated that the issue has been addressed with the reprocessing of N20 data.

During the review (on slide 17,18), the team raised that the Data Product Spec (DPS) specs are looser than those in the JERD VolI that the team has used for previous maturity reviews. JPSS/DPMS confirmed that there is no change of the requirements for the ocean color products from JERD Vol2 to Ground Serment Data Product Specs, except it was refined to be more detailed in DPS (See Appendix A).

SeaBASS dataset geographically comprehensive, nice to see in addition to MOBY, A- consider subset for Gulf of Mexico (difficult , important region), B- SeaBASS provides measured Chl-a (unique measurement compared to radiances), consider referencing on Slide 55 how dataset contributes to unique validation understanding (if true)

Show 1 standard deviation range on charts that show averages to provide more information on the spread of values

Consider using 28-32 days for averages (similar to land team) for comparisons of NPP and NOAA-20, instead of using 1-day’s worth of data.

Satya: On slide 55 the tables should be mapped to the specs.

NOS: slide 9: Kd 490. What is robustness of method going from oceanic to coastal (CDOM/sediment influenced, Case 2)?
Combination of Chl-a anomaly and Chl-a anomaly ratio will support algal bloom detection in a range of water types.
slide 11: Merged SNPP NOAA-20 Chl-a product to reduce gaps (due to orbit, glint, etc). Is a good development. DINEOF merger would be useful for California, it might allow us to simplify and reduce preparatory work for C-HARM (CA Harmful Algae Regional Model) input, as we use DINEOF for that. Gulf of Mexico "red tide" and estuary (e.g. Chesapeake) have too much temporal/spatial variability for DINEOF to produce accurate products in those areas.

**RFAs:**

1. To provide users information (Menghua): Jim Gleason requested the team to identify the users' information for each product listed on slide 9, also describe the process how the team interacted with the users and bring the requested products to product generation.
2. Team to provide independent assessment from NOS users (Rick Stumpf) - The accuracy of Ch-a concentration in both the California and the Gulf-of- Mexico regions are critical for current OC operational (HAB) users. Request the team provides a graph about comparison of Chl-a concentration between VIIRS OC retrievals and SeaBASS measurements separately for California and the Gulf-of- Mexico region (refer to slide # 21 that covers all pixels). Bias in the Chl-a retrievals should be determined.
3. Update the error budget tables in the presentation (slide 55) to use the same units as those in the requirements documents, and send the updated slide to the review team.
4. Slide 26-27. Are errors correlated between bands? For a ratio algorithm, e.g. 556/489, what is the error?

**Appendix A:** **JERD Vol-2 (document retired) Ocean Color requirements trace to GSegDPS Ocean Color requirements (Response from JPSS/DPMS: Adetomiwa Ibironke (Tomi) )**

| JERD Vol-2 Requirements | GSegDPS requirements | Rationale |
|---|---|---|
| **JERDv2-2128:** The algorithm shall produce an OC/C product during clear conditions.<br>**JERDv2-2129**: The algorithm shall produce an OC/C product during daytime conditions. | **DPS-88:** The Ocean Color/Chlorophyll product shall provide ocean color (nLw), chlorophyll-a, and optical properties; for ocean, coastal, or inland water; daytime; in clear conditions; at the refresh rate of the instrument. | **The DPS requirements did not become more looser but I would say it was refined to be more detailed. Work was done to replace related requirements from JERD Vol-2 and GSRD Vol-2 with related requirements in DPS. I believe the intention was for the requirements to be more concise while maintaining the expectations for scientists to provide optimum artifacts to validate their products.** |

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| **JERDv2-2132:** The algorithm shall produce an OC/C product that has a measurement range of:<br>0.1 – 50 W/m2/um/sr for ocean color,<br>4.6/(10)2 to 1.0/m for optical properties – absorption,<br>4.0/(10)4 to 1.1/(10)2/m for optical properties – backscattering, and<br>0.01 to 100 mg/m3 for chlorophyll.<br>JERDv2-2133: The algorithm shall produce an OC/C product that has a measurement precision (open ocean, blue band) of:<br>10% operational (5% science quality) for ocean color,<br>20% for optical properties,<br>30% for chlorophyll at Ch1 < 1 mg/m3<br>30% for chlorophyll at 1.0 mg/m3 < Ch1 < 10 mg/m3, and<br>50% for chlorophyll at Ch1 > 10 mg/m3. | **DPS-89:** The Ocean Color/Chlorophyll product shall provide optical properties with a measurement precision of 20%, over the measurement range of the instrument. | |
| **JERDv2-2132** | **DPS-90:** The Ocean Color/Chlorophyll product shall provide ocean color with a measurement precision of 10%, over the measurement range of the instrument. | |

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| **JERDv2-2132** | **DPS-91:** The Ocean Color/Chlorophyll product shall provide chlorophyll-a density with a measurement precision of 30% below 10 mg/m^3, and 50% at and above 10 mg/m^3, over the measurement range of the instrument. | |
| **JERDv2-2134:** The algorithm shall produce an OC/C product that has a measurement accuracy (open ocean, blue band) of:<br>10% operational (5% science quality) for ocean color,<br>35% operational (25% science quality) for optical properties,<br>35% operational (25% science quality) for chlorophyll at Ch1 < 1 mg/m3<br>30% operational (25% science quality) for chlorophyll at 1.0 mg/m3 < Ch1 < 10 mg/m3, and<br>40% operational (30% science quality) for chlorophyll at Ch1 > 10 mg/m3. | **DPS-93:** The Ocean Color/Chlorophyll product shall provide ocean color with a measurement accuracy of 10%. | |
| **JERDv2-2134** | **DPS-94:** The Ocean Color/Chlorophyll product shall provide optical properties with a measurement accuracy of 35%. | |

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| **JERDv2-2134** | **DPS-95:** The Ocean Color/Chlorophyll product shall provide chlorophyll-a density with a measurement accuracy of 35% below 10 mg/m^3, and 40% at and above 10 mg/m^3. | |