Monday, October 8
Poster Session 1
16:00–18:00

Poster 69

CHLOROPHYLL-A ALGORITHMS FOR SOUTHWEST TROPICAL PACIFIC WATERS

The NASA OBPG operational surface chlorophyll-a algorithms, i.e., OC3 and combined OCI-OC3, are evaluated for Southwest Tropical Pacific (SWTP) oligotrophic waters using bio-optical data collected during the February-March 2015 OUTPACE cruise. Total chlorophyll-a concentration (TChl-a) obtained from in situ "remote sensing" reflectance measurements is underestimated by a factor of approximately 2 in the range 0.02-0.8 mg/m^3, which is explained by a much lower diffuse attenuation coefficient than the average coefficient for world-wide conditions, especially in the blue. The pure seawater absorption coefficient in the near ultraviolet and visible, estimated from data at the clearest stations, agrees with the most recent determination. Application of the algorithms to MODIS-A imagery reveals a much noisier spatial field using OC3 than combined OCI-OC3, with semi-variance reduced from 0.01 to 0.001 (logarithmic scale) at one pixel distance, confirming previous studies. A sensitivity study further indicates that OCI is very robust to atmospheric correction uncertainties, but more impacted than OC3 by phytoplankton type variability in its applicability domain. A normalized "remote sensing" reflectance difference (NDPI) offers a good compromise in terms of resistance to both atmospheric correction and phytoplankton type noise. Time series of monthly MODIS-A TChl-a in the SWTP during 2003-2017 expose, not only the higher values, but also a much larger seasonal cycle when generated with NDPI, adjusted on the OUTPACE data, than OC3 and combined OCI-OC3, with consequences on standing stock and production assessments, and point to the lack of generality in the standard algorithms routinely applied, even for Case 1 waters.

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