**Ocean color algorithm uncertainty evaluation using Monte Carlo computational methods**

Joaquín E. Chaves1, 2, P. Jeremy Werdell2, & Christopher W. Proctor1, 2

The large global datasets used for the development of algorithms to estimate ocean color-derived biogeochemical parameters from space-borne sensors, such as chlorophyll-*a* (Ca), assemble observations from a variety of *in situ* optical sensors and analytical laboratory protocols, contributed over a period of years by dozens of investigators worldwide. Each algorithm-derived magnitude ideally must be ascribed a measure of uncertainty. In practice, that objective remains challenging. The establishment of uncertainty budgets for derived parameters through classical error propagation approaches is rendered impractical, if not intractable, by the complexity and heterogeneity within algorithm development datasets. An alternative approach is to use Monte Carlo statistical methods to mine the observation variability embedded in calibration datasets to establish measures of uncertainty. We present preliminary results from Monte Carlo exercises aimed at establishing uncertainty measures for Ca algorithms developed with the NASA bio-Optical Marine Algorithm Data set (NOMAD). NOMAD is a publicly available, global, high quality *in situ* bio-optical data set for use in ocean color algorithm development and satellite product validation activities. The dataset includes coincident observations of water-leaving radiances, surface irradiances, downwelling attenuation coefficients, and Ca concentrations contributed by the ocean color research community. We applied Monte Carlo by introducing various forms of randomization in the data reduction techniques used to develop NOMAD from the community-contributed observations to assess the uncertainty of selected ocean color algorithms. This approach also presents the opportunity to execute sensitivity analysis experiments to assess the contribution of the various sources of variability to algorithm uncertainty budgets.

1Science Systems & Applications, Inc., Lanham, MD

2NASA Goddard Space Flight Center, Greenbelt, MD