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Using OLCI/Sentinel-3 and Sentinel-5-P data synergistically for retrieving different phytoplankton groups from space

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We are proposing the development of an algorithm, using the combination of data from OCLI (Sentinel-3) and Sentinel-5P sensors, which derives globally pyhtoplankton groups (phytoplankton functional types) biomass. The information of the total biomass will be achieved by standard processing of the Chlorophyll-a (chl-a) concentration using satellite data from multispectral imaging instruments (firstly SeaWiFS, MODIS and MERIS merged within the GlobColour data set, later OLCI data). The percentage of the main phytoplankton types on the total biomass will be retrieved by the analysis of characteristic absorption features in hyperspectral satellite measurements (firstly SCIAMACHY, later Sentinel-5-P) using the PhytoDOAS method by Bracher et al. (2009) and improved by Sadeghi et al. (2011). Thus, a synergistic product from information of multi- and hyperspectral satellite instruments which complements one another will be developed. The two instruments of the Sentinel mission will enable a data product of weekly to monthly temporal and 7 km by 7 km spatial resolution. On the the SCIAMACHY/Globcolour product (starting in 2002 until today) will be limited to a monthly and 0.5° degree resolution. The application of the algorithm is for assessing the spatial and temporal variability of specific phytoplankton types' biomass on longer time scale (10 to 20 and more years) with global coverage. This will engross the understanding of the role of different phytoplankton types in the world ocean's ecosystem and improve estimates on the contribution of different phytoplankton types to the global carbon cycle. The concept of the algorithm development, including its uncertainity determined via validaton with in-situ phytoplankton data and sensitivity studies using the coupled atmospheric-oceanic radiative transfer model SCIATRAN (Rozanov et al. 2002, Blum et al. in press) and examples for its application are given in the presentation.

References:

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