

## Merging chlorophyll concentration from MERIS and MODIS sensors for the operational monitoring of coastal waters.

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Optimal interpolation is applied to ocean colour data processed at Ifremer. The method is based on a geostatistical model of the space-time variability of the Chlorophyll-a observed from satellite sensors. Before merging, the consistency between the chlorophyll concentrations derived from the different ocean colour sensors (SeaWiFS, MODIS and MERIS) has been checked through comparisons with in situ data and cross-validations between the sensors. Conversely to other merging procedures applied to ocean colour data, the chlorophyll concentration and not the water-leaving radiance is the merged variable. This is in continuity with the Ifremer's method to process directly the chlorophyll concentration on the Western European continental shelf through Look-Up-Tables applied to the spectral radiance. Firstly the daily mean chlorophyll concentration on the period 1997-2007 is calculated from the three sensors. Secondly, the chlorophyll anomaly, defined as the difference between the observation and the daily mean, is calculated from the products of the three sensors. The structural analysis of anomaly is made through the generation of semi-variograms which are automatically calculated on the IBI-ROOS area (Ireland-Biscay-Iberia Regional Operating Operational System). Semi-variograms are proposed on a monthly basis and on sub-regions. A mean formula is proposed to relate the parameters of the semi-variograms, as the nugget effects and the sill (plateau of the variance), to the square of the mean of chlorophyll concentration. Then, SeaWiFS, MODIS and MERIS anomalies in chlorophyll concentration are merged by kriging on a daily basis, using 10 following images centred on the considered day. This complete daily time series of the chlorophyll concentration will be used for a better understanding of the variability of the phytoplankton biomass and the validation of the biogeochemical models used in coastal oceanography. This activity is supported by the ECOOP (European Coastal Sea Operational Observing and Forecasting System) and Previmer ( Centre for coastal oceanography in Brest) projects.

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