# GRIDDING AND ARCHIVING OF SATELLITE-DERIVED OCEANOGRAPHIC DATA FOR ANY REGION ON EARTH

*Quinten Vanhellemont, Bouchra Nechad, Kevin Ruddick*

*Royal Belgian Institute for Natural Sciences (RBINS), Management Unit of the North Sea Mathematical Models (MUMM)*
*E-mails: q.vanhellemont@mumm.ac.be, b.nechad@mumm.ac.be, k.ruddick@mumm.ac.be*

**Keywords:** *chlorophyll concentration, total suspended matter concentration, sea surface temperature, MODIS, MERIS*

## ABSTRACT

The JELLYFOR project aims to set up a jellyfish forecasting system based on in situ and remote sensing input data. Existing image processing software from the BELCOLOUR project was improved, extended and adapted to process large numbers of MODIS and MERIS images in order to create a gridded dataset of chlorophyll a concentration (chl), of sea surface temperature (sst – MODIS only) and of total suspended matter concentration (tsm). The software focuses on flexibility; the configuration of a new region is as simple as defining the bounding box in latitude and longitude. The software can be easily adapted to producing new and custom products. Additional sensors or datasets can be added if an appropriate reader is available or implemented.

OceanColor MODIS Aqua L2 files from NASA and MERIS RR L2 files from ESA were processed for an eight-year period (01/01/2003 – 31/12/2010) for the three regions in the JELLYFOR project. The necessary datasets are automatically imported, quality controlled and reprojected to a standard grid using a nearest-neighbour approach to retain information on fronts and different water masses. The grid uses an equirectangular projection generated per region, with cell sizes of about one by one kilometre for MODIS and MERIS RR data and of 250 by 250 metre for MERIS FR data. The software for extracting and gridding of the datasets is generic, highly automated and flexible, so that a similar archive can readily be created for any region on earth. The software is also used to process MODIS and MERIS (both full and reduced resolution) data on a near real-time basis.

The tsm algorithm of Nechad et al. (2010) that is used to compute tsm from MODIS reflectance data is calibrated in turbid waters and might provide inaccurate results for clearer waters. The algorithm, however, can be easily adapted with regional specific inherent optical properties (SIOPs). The MODIS chlorophyll a dataset is known to be less reliable in turbid waters (Park et al., 2010), therefore an additional quality control and masking is applied in these waters.

An incredible amount of information can be extracted from the archive, for example eight year time-series for every location within the region and monthly and climatological average maps. In a multi-year dataset of remotely sensed parameters, known oceanographic features are apparent. Using monthly composites and time-series, the inter-annual changes and the evolution throughout the year can be analysed. The archive can be used for a wide range of applications in marine biology, sediment transport, coastal management, etc.

A long-term remote sensing dataset is a useful tool for understanding the oceanography of any region, be it a well-studied or a relatively unknown one. Due to the generic approach and fast processing such a dataset can be readily generated.

## References

B. Nechad, K.G. Ruddick, Y. Park. 2010. Calibration and validation of a generic multisensor algorithm for mapping of total suspended matter in turbid waters, Remote Sensing of Environment 114: 854-866.

Park, Y-P., Ruddick, K., Lacroix, G. (2010) Detection of algal blooms in European waters based on satellite chlorophyll data from MERIS and MODIS, International Journal of Remote Sensing, Volume 31 Issue 24, July 2010