BELGIAN EARTH OBSERVATION

HYPERMAQ Hyperspectral and multi-mission high resolution optical remote sensing of aquatic environments

Programme	**Contract**	**Start - End**	**Project type**
STEREO III	SR/00/335	1 December 2016 - 30 November 2021	Thematic network

https://eo.belspo.be/HYPERMAQ
https://eo.belspo.be/HYPERMAQ-webstory

HYPERMAQ

Context and objectives

Algorithms for remote sensing of suspended particulate matter and chlorophyll concentration are quite mature and applications related to coastal sediment transport and environmental monitoring are routinely using satellite data. The challenge for researchers is now to estimate more than just concentration. Sediment transport users want spatial and temporal information on particle size and composition. Marine biologists and water quality managers want information on phytoplankton and benthic community composition, which is particularly difficult to obtain from remote sensing in turbid waters. The advent of spaceborne hyperspectral instruments offers the potential to yield more information on aquatic particles, both algal and non-algal.

The objective of the HYPERMAQ project was then to develop new remote sensing algorithms using hyperspectral data for estimating in turbid waters: microalgae and macroalgae species composition, sediment type and size and water reflectance with an improvement of atmospheric correction.

Project outcome

Scientific results

In plus of the large data collection, HYPERMAQ results include the production of two PANTHYR prototypes, the refinement of algorithms for *P. globosa* detection in the North Sea, algorithm for floating vegetation in the Rio de la Plata, algorithm for main phytoplankton groups in the China Sea, a better understanding of limitations in detection of particle size distribution from water radiometry and a better understanding of Spuikom ecology. Regarding remote sensing application, HYPERMAQ results also showed that an excellent relative inter-band calibration of hyperspectral sensors will be critical for phytoplankton species detection.

Societal (including environmental) relevance

Results of HYPERMAQ will allow improving water monitoring using remote sensing for example to monitor floating vegetation in Rio de la Plata or the real time monitoring of *P. globosa* in North Sea with PANTHYR measurements.
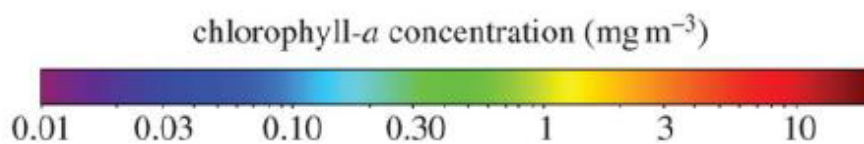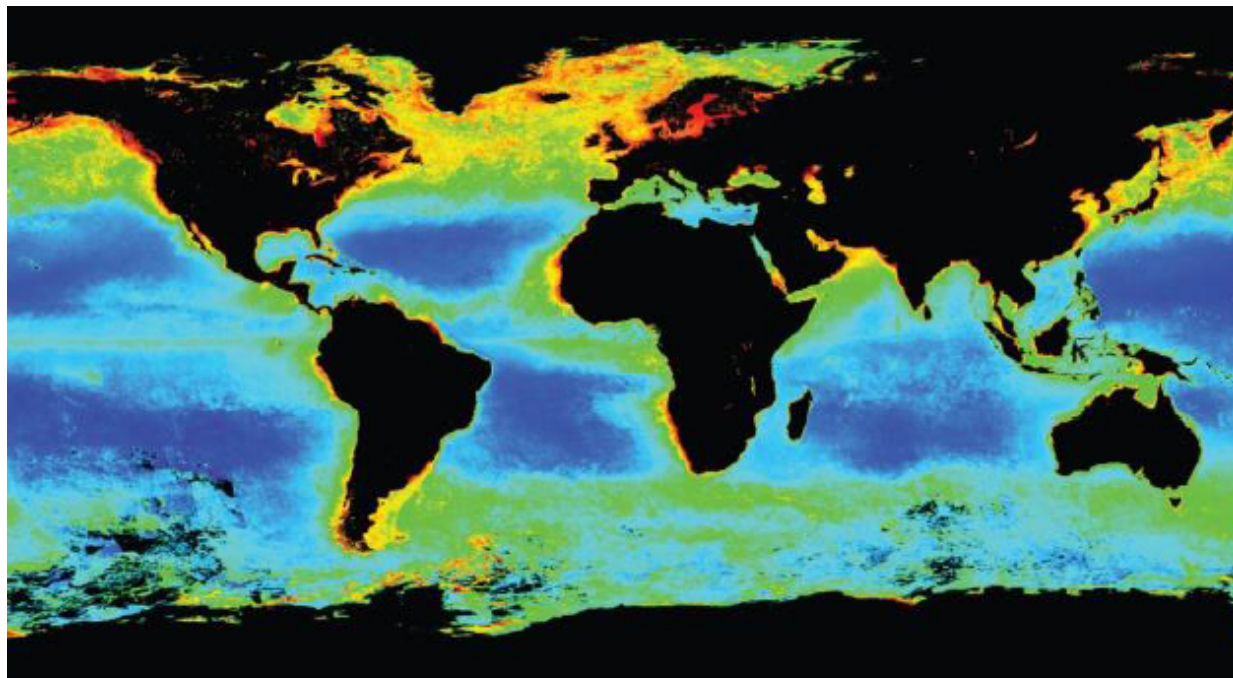
Products and services

Several datasets and algortihms have been developed during the HYPERMAQ project: see the STEREO Toolbox page: https://eo.belspo.be/en/stereo-toolbox.

Potential users

Water environmental agencies.

chlorophyll-*a* concentration (mg m^{-3})

0.01   0.03   0.10   0.30   1   3   10

Project leader(s)

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