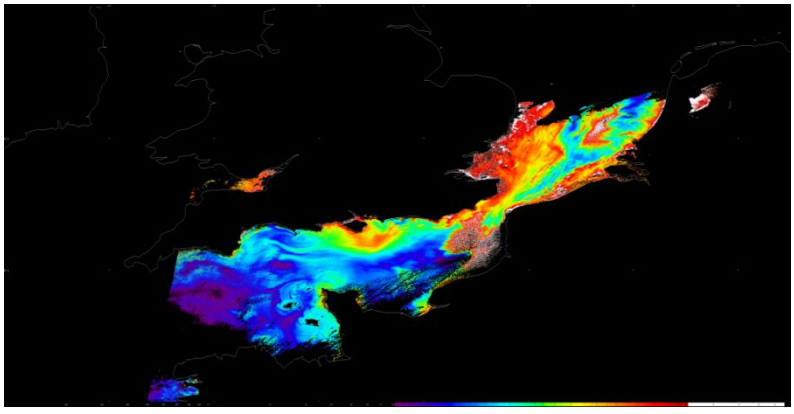
Ocean colour from Space

Earth Observation from space began about 40 years ago mainly aiming to improve the weather forecast. The remote sensing of the "ocean colour" started in 1978 with the launch by USA of an experimental sensor: the *Coastal Zone Color Scanner* (CZCS). The objective was to evaluate, at a global scale, the abundance of the phytoplankton, the first component of the food chain. This instrument provided an innovative picture of the spatio-temporal distribution of the phytoplankton distribution in the ocean. It has, with other instruments, contributes to demonstrate the use of satellite remote sensing applied to oceanography. After a 10 years gap, CSCZ had successors and some of them are reported in the table below.

Satellite	Instrument	From	Period
Nimbus7	Coastal Zone Color Scanner (CZCS)	USA	1978-1986
ADEOS	Ocean Color and Temperature Scanner (OCTS)	Japan	1997-1998
SeaSat	Sea-viewing Wide Field-of-view Sensor (SeaWiFS)	USA	1997-2010
Terra	Earth Observing System's MODerate resolution Imaging Spectro-radiometer (MODIS)	USA	2000-present
Acqua	MODIS	USA	2000-present
Envisat	MERIS	Europe	2002-2012
NPP	Visible/Infrared Imager/Radiometer Suite (VIIRS).	USA	2011-present

The ocean colour sensors were conceived to observe at global scale our oceans the phytoplankton. They observe the whole globe and each pixel represents approximately one square kilometre of the ocean. The water quality monitoring from space in the coastal areas requires a better spatial resolution and more spectral bands. With the technical improvements, it is now possible to maintain a daily sampling period with a better spatial resolution and more colours. ISECA takes advantage of this new technology by using MERIS at 300 m and VIIRS at 250 m. Through these activities, we are paving the way for the exploitation of future missions with spatial resolution of few decametres.

One objective of ISECA is to improve the current algorithms which convert the satellite images into maps of relevant indicators to study eutrophication. These improvements will result from a better knowledge of the optical properties both of the atmosphere and of the ocean, based on the analysis of the in-situ measurements collected by the ISECA partners.



One of the last MERIS image acquired on April 2012. The chlorophyll amount is represented in false colours (increasing from blue to red).

We see a greater degree of eutrophication in the North Sea, particularly at the month of the big rivers (Thames, Rheine, Escaut). In the English Channel, in the Western coast of England, the chlorophyll amount is low.

Bibliographie : David Antoine. Apports de la télédétection spatiale de la « couleur de l'océan » à l'océanographie. Océanis • vol. 24 no 2 • 1998 • p. 81-150