Geophysical Research Abstracts, Vol. 9, 02227, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-02227


# Optical Tracers of Environmental Features in the European Marginal and Enclosed Seas

V. Barale

Institute for Environment and Sustainability, JRC EC, Ispra, Italy (vittorio.barale@jrc.it / Fax: +39-0332-789034 / Phone: +39-0332-789274)

Optical observations offer a wide range of possibilities, complementing more conventional *in situ* data gathering, for the large-scale, long-term assessment of interacting physical and bio-geo-chemical processes at the regional – as well as the global – scale. The assessment of environmental features from the vantage point offered by satellites in Earth's orbit allows to observe at a glance the dynamical relationships of natural setting, water exchanges, basic ecological relations and their main driving forces, as well as the environmental problems faced by marginal and enclosed seas. While several sites in the European seas have been studied in detail and for a long time, others remain surprisingly unexplored. Understanding the inner workings of these seas – aiming to reconcile the conflicting needs of protecting their ecological balance and exploiting their natural resources – requires adequate observation systems, integrating both in situ and remote sensing techniques. The systematic and synoptic appraisal of surface parameters by means of orbital sensors like the SeaWiFS and the MODIS can help closing some of the existing knowledge gaps. The near-coastal marine regions surrounding the European continent – the Norwegian Sea, the Barents Sea and the White Sea to the north; the North Sea, the Irish Sea, the Celtic Sea, the English Channel, to the west, as well as the Bay of Biscay and the Gulf of Cadiz, to the south – can be considered marginal basins of the Atlantic Ocean, where oceanic conditions prevail. Visible imagery of these basins show a wide spectrum of environmental traits, ranging from sub-polar to sub-tropical climatic zones. The patterns of water constituents, over the broad continental shelf that constitute most of these basins, suggest that coastal interactions, strong tidal mixing and oceanic currents are the main factors shaping their concentration and distribution. In the European enclosed seas, thermohaline conditions are the prevailing environmental drivers. The Baltic Sea, the Black Sea and

the Caspian Sea are dilution basins, where stratification due to the large freshwater input can prevail, while the Mediterranean Sea is a concentration basin, where vertical mixing is strong. The optical tracers appearing in the visible imagery show the great impact of river runoff, particularly in the case of dilution basins, and the key role played by atmospheric forcing in triggering periodic episodes such as algal blooms, in the concentration basin case. As suggested by these examples, an in-depth analysis of the existing time series of optical data, and their intercomparison with information derived from other means of environmental monitoring, can provide clues to help compose the unique mosaic of dynamical and bio-geo-chemical features of the European Seas.