Tracing back nutrients from Southern North Sea eutrophicated areas up to the watersheds

Valérie Dulière (1), Nathalie Gypens (2), Christiane Lancelot (2), Vincent Thieu (3), Patrick Luyten (1), and Geneviève Lacroix (1)

(1) Operational Directorate Natural Environment (OD Nature) Royal Belgian Institute of Natural Sciences (RBINS) Gulledelle 100, 1200 Brussels, Belgium, (2) Ecologie des Systèmes Aquatiques Université Libre de Bruxelles CP221, boulevard du Triomphe, 1050 Brussels, Belgium, (3) UMR METIS Université Pierre et Marie Curie place Jussieu, 75252 Paris Cedex 05, France

The Southern North Sea faces eutrophication problems. They result from growing anthropogenic pressure in the river watersheds, and subsequent increase in nutrients (nitrogen and phosphorus) loading to the sea. Establishing the link between human activities and eutrophication problems requires the identification of the major nutrient sources and the ecological response of the coastal ecosystem to these nutrient alterations. This information is crucial to mitigate eutrophication in coastal zones by applying appropriate dual-nutrient reduction strategies, therefore achieving the Good Environmental Status of EU marine waters by 2020.

The marine biogeochemical model (MIRO&CO) has been coupled to a newly developed generic watershed model (PyNuts) based on Riverstrahler model. A nutrient tracking approach has been adapted and implemented in MIRO&CO. The transboundary nutrient transport method has been used to track the nutrients in the sea, and trace back their sources (river, ocean, and atmosphere). Here, the relative contributions of the different nutrient sources will be presented. Results show that the nitrogen contribution from atmospheric deposition is not negligible and that the nutrients released by French rivers reach the Southern North Sea in significant proportions.

This work has done in the framework of the EMoSEM EU project (http://www.odnature.be/emosem/) that aims at providing support to eutrophication management in the North Atlantic Ocean, using state-of-the-art modelling tools.