Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09757, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09757
EGU General Assembly 2008

Modeling Nitrogen and Phosphorus Retention in the Coastal Ocean at the Global Scale

G. G. Laruelle (1), H. H. Dürr (2), C. Van Kempen (1), C. P. Slomp (1), H. Middelkoop (2), M. Meybeck (3)

(1) Faculty of Geosciences, Department of Earth Sciences - Geochemistry, Utrecht University, the Netherlands (2) Faculty of Geosciences, Department of Physical Geography, Utrecht University, the Netherlands (3) UMR Sisyphe, Universite Pierre et Marie Curie, Paris VI, Paris, France (g.laruelle@geo.uu.nl / Phone: +31 30 253 32 64)

Human activity is leading to major increases in terrestrial nutrient inputs to the ocean, and a deterioration of coastal water quality in many regions. As yet, no modeling tools are available to quantitatively assess the changes in nutrient cycling in the global coastal ocean in a spatially-explicit manner.

Here, we present a model of the coupled nitrogen (N) and phosphorus (P) cycles in the proximal coastal ocean that is linked to a Geographical Information System (GIS) and allows a spatially-explicit assessment of the consequences of the changes in river and groundwater fluxes for nutrient transformation and retention in the coastal ocean at the global scale. Our process-based model consists of a “ribbon” of generic box models distributed along the entire global coast-line at a half degree resolution. Different parameterizations for the box models are established using a global coastal typology based on hydrological, lithological, morphological and biogeochemical criteria. In our presentation, we will present results of simulations performed using spatially-explicit nutrient inputs (GlobalNEWs) and other relevant forcings (including light and temperature) and we will discuss the role of various types of near-coastal ecosystems (estuaries, fjords, lagoons, delta’s and others) in retention of nutrients at the global scale.