3rd International Conference on Earth System Modelling
Vol. , 3ICESM-304-1, 2012
3rd International Conference on Earth System Modelling

Fluxes and retention of silicates from nine major reservoirs in Mediterranean coastal watersheds (Algeria)

M. Ounissi (1), N. Bouchareb (2), Y. Belhadi (3), O-R. Ziouch (4), F-Z Taamallah (5), and H. Laskri (6)

(1) Faculty of science, University Annaba badji Mokhtar, Annaba, Algeria (ounissi_mk@yahoo.com), (2) Faculty of science, University Annaba badji Mokhtar, Annaba, Algeria , (3) Faculty of science, University Annaba badji Mokhtar, Annaba, Algeria , (4) Institute of ecology, Khenchela University (oziouch@yahoo.fr), (5) Faculty of science, University Annaba badji Mokhtar, Annaba, Algeria (taamallahfz@yahoo.fr), (6) Faculty of science, University Annaba badji Mokhtar, Annaba, Algeria (laskri.hadjer@yahoo.fr)

The silica is known to play a major role in earth systems by sustaining diatom productivity and by the elimination of atmospheric carbon dioxide. The long-term decrease of silica (Si) in coastal watersheds is directly attributed to its retention in dams. Also, the increase in anthropogenic inputs of dissolved inorganic nitrogen (N) and phosphorus (P) parallel to the decrease in Si:N and Si:P ratios can result in Si limitation and may lead to drastic modifications of phytoplankton composition and marine ecosystems productivity. This study aims at estimating silicates budgets in nine reservoirs of coastal watersheds in order to determine the amounts of silicates losses and their equivalent in carbon dioxide eliminated in parallel. The nine studied dams hold the half of the intercepted runoff (5.2 billion m3 storage capacity) of Algerian coastal watersheds which represents about 42% of the total runoff reaching about 12.5 billion m3. Water samplings and flow measurements were taken two times a month at the respective entrances and exits of dams and at the outlets of rivers. Despite its low levels, varying in average in the range of 50 to 100μM, SiO4 experienced also large rate retention in dams. Compared to the incoming fluxes, the dams retained annually about 40 to 60% of Si-SiO4, representing respectively 8,000 and 10,000 t/y. On the basis of Redfeild ratios, these amounts may be equivalent to 50,000 to 80,000 t of phytoplanktonic carbon lost to the dams waters and sediments. The most important retention rates were found in little and old dams while the lowest retention rates are specific to the recent and large dams as the Beni-Haroun and Kodiat-esserdoune ones. At the outlets of rivers, the total fluxes of Si-SiO4 into the coastal waters reach in average 18,000 to 20,000 t/y. These modifications in levels and in fluxes of Si behind dams, will have several impacts on the coastal ecosystem functioning and productivity, and on the carbon cycle at atmosphere-land-ocean interactions