



## Modeling biogeochemical processes in sediments from the Rhône River prodelta area (NW Mediterranean Sea)

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Auteur	Pastor, L. [1], Cathalot, Cécile [2], Deflandre, Bruno [3], Viollier, Eric [4], Soetaert, Karine [5], Meysman, F.-J.-R. [6], Ulses, C. [7], Metzger, Édouard [8], Rabouille, Christophe [9]
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ISSN	1726-4189
Résumé en anglais	<p>In-situ oxygen microprofiles, sediment organic carbon content and pore-water concentrations of nitrate, ammonium, iron, manganese and sulfides obtained in sediments from the Rhône River prodelta and its adjacent continental shelf were used to constrain a numerical diagenetic model. Results showed that (1) organic matter from the Rhône River is composed of a fraction of fresh material associated to high first-order degradation rate constants (<math>11-33 \text{ yr}^{-1}</math>), (2) burial efficiency (burial/input ratio) in the Rhône prodelta (within 3 km of the river outlet) can be up to 80%, and decreases to <math>\sim 20\%</math> on the adjacent continental shelf 10-15 km further offshore (3) there is a large contribution of anoxic processes to total mineralization in sediments near the river mouth, certainly due to large inputs of fresh organic material combined with high sedimentation rates, (4) diagenetic by-products originally produced during anoxic organic matter mineralization are almost entirely precipitated (<math>&gt;97\%</math>) and buried in the sediment, which leads to (5) a low contribution of the re-oxidation of reduced products to total oxygen consumption. Consequently, total carbon mineralization rates as based on oxygen consumption rates and using Redfield stoichiometry can be largely underestimated in such River Ocean dominated Margins (RiOMar) environments.</p>
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