



Manganese, iron and phosphorus cycling in an estuarine mudflat, Loire, France

Submitted by Luzia Bossé on Wed, 02/01/2017 - 16:37

Titre Manganese, iron and phosphorus cycling in an estuarine mudflat, Loire, France

Type de publication Article de revue

Auteur Thibault de Chanvalon, Aubin [1], Mouret, Aurélia [2], Knoery, J. [3], Geslin, Emmanuelle [4], Péron, O. [5], Metzger, Édouard [6]

Pays Pays-Bas

Editeur Elsevier

Ville Amsterdam

Type Article scientifique dans une revue à comité de lecture

Année 2016

Langue Anglais

Date Décembre 2016

Pagination 92-102

Volume 118

Titre de la revue Journal of Sea Research

ISSN 1873-1414

Mots-clés Ascorbat extraction [7], Flood deposition [8], RiOMars [9], Savitzky Golay filter [10], Transient diagenesis [11]

Résumé en anglais
The sampling of surface sediment from two sites of a mudflat of the Loire Estuary during four contrasting seasons has led to new information about geochemical cycling under transient diagenesis fuelled by flood deposition. Based on stocks of reactive iron-oxides and manganese-oxides (ascorbate-extracted) and pore water concentrations, the progressive evolution of flood deposits is described. Three major steps are observed: at first, there is no manganese, iron and phosphorus release into pore water within the flood-deposited layer. Then, during a period of approximately 1 month, Mn oxides are consumed while the dissolved Mn concentration increases. Simultaneously, the Fe oxide-rich layer from flood deposition prevents (or at least limits) phosphorus release into pore water as shown by the increasing P/Fe ratio of the ascorbate extractions. During spring and summer, Fe oxides are reductively dissolved until complete depletion results. This period also corresponds to the saturation of Fe oxides by phosphorus and probably maximum P release to the water column. The site located closer to the shore showed higher density of benthic faunas leading to more intense bioirrigation. The importance of bioturbation on the year scale for biogeochemical processes is discussed according to both bioirrigation and biomixing processes.

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DOI 10.1016/j.seares.2016.10.004 [13]

Lien vers le document <http://www.sciencedirect.com/science/article/pii/S1385110116302635> [14]

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