

## Fe and Ni cycling in mangrove sediments from New Caledonia

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Mangroves sediments are generally considered as playing a protective role against dispersion of trace metals into marine ecosystems [1]. However, little is known about the speciation of these trace metals in mangrove sediments, despite the importance of this parameter for evaluating their solubility, bioavailability and long-term behavior.

We report here the results of our recent studies that have elucidated Fe and Ni speciation in mangrove sediments downstream lateritic Ni deposits developed over ultramafic rocks in New Caledonia, the third largest nickel producer in the world. We combined Ni and Fe K-edges XAS data with mineralogical (XRD) and spatially-resolved chemical analyses (SEM-EDS) of the solid fraction, as well as chemical analyses of the pore-waters, in order to relate metal speciation and mobility in these complex natural systems.

The results obtained suggest that, in New Caledonia, Ni-bearing iron-sulfides that form in the anoxic horizons of mangrove sediments [2] make this ecosystem a potential long-term sink for iron and nickel eroded from lateritic ore deposits. However, the efficiency of this sink is directly related to the stability of iron-sulfides, which is strongly influenced by the vegetation cover and the distance from the sea [2] [3]. These findings have important environmental implications to better evaluating the protective role of mangroves against trace metals inputs at the land-sea interface in the inter-tropical region. They may also help in predicting the response of mangrove ecosystems to increasing anthropogenic pressure.

[1] Marchand et al. (2012) *Chem. Geol.* **300-301**:70-80

[2] Noël et al. *GCA* submitted [3] Noël et al. (2014) *GCA* **136**:211-228