Mercury deposition through litterfall and subsequent accumulation in soils: Does forest community type matter?

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This research investigated the influence of community type on mercury deposition to forest soils. Prior studies have estimated that roughly half of the mercury deposition in forests occurs through litterfall. Because of the importance of litterfall in the mercury deposition process, the presence or absence of forest and the type of forest may have a large impact on the magnitude of the deposition fluxes and accumulation in soils.

Eighteen sites were sampled in 2008 and 2009, throughout Vermont, USA. The sites were located in three distinct forest community types: Northern Hardwoods, Enriched Northern Hardwoods, and Lowland Spruce-Fir. This poster will present total mercury (THg) concentration in the upper soil horizons and THg concentrations in leaves for the dominant tree species at each site.

Research has shown that mercury in soils relates to the retention of organic carbon. Mercury to carbon ratio has previously been suggested for assessing Hg mobility. Mercury to carbon ratios will be presented for our research sites, by soil horizon.

Earthworms are invasive in Vermont and may greatly influence the distribution of organic matter in soils and have the potential to affect the ability of soils to act as a sink for mercury. Earthworms were detected at some but not all of the sites sampled. The detection or non-detection of earthworms and the associated forest floor depth will be discussed.

The influence of forest community type on each of these topics will be discussed.

Importance of phyllosilicates and Fe/Mn oxyhydroxydes on the distribution of Ni and Cr along a lateritic soil in New Caledonia

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In New Caledonia, tropical weathering of ultramafic rocks (peridotites) has lead to the development of very thick regoliths, which contain large amounts of trace elements (Ni, Co, Mn, Cr). Although interesting from an economical point of view, such an occurrence of large amounts of potentially toxic elements can be hazardous for the environment. It is then important to characterize the crystal-chemistry of these elements in order to identify the processes driving their transport and/or immobilization upon weathering of ultramafic rocks.

Results of a study performed along a 64 m depth lateritic regolith in the Mt Koniambo (West Coast of New Caledonia) emphasize the major control of phyllosilicates (talc and serpentine) and Fe and Mn oxyhydroxydes on the crystal-chemistry of Ni and Cr. When going from the bedrock to the lateritic part of the regolith, Ni moves from Ni/Mg-phyllosilicates to secondary Fe oxyhydroxydes, whereas Cr moves from primary silicates and chromite to Cr (III) bearing Fe oxyhydroxydes [1-3]. In addition, the occurrence of Ni/Co asbolane and of Cr (VI) after oxidation of Cr (III) by Mn oxyhydroxydes emphasize the importance of this mineral species in the intermediate part of the regolith [2, 3].

[1] Fandeur *et al*. (2000) *Am. Min*. **94**, 710–719. [2] Fandeur *et al*. (2009) *ES&T* **43**, 7384–7390. [3] Juillot *et al*. (2010) *GCA*, in prep.