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# Atmospheric trace metal inputs in the Misten bog (East Belgium): Special attention to sampling techniques and site-spatial variability.

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Peat bogs have a great potential to record anthropogenic inputs via their constituting mosses, because they draw their nutrients only from the atmosphere. These atmospheric inputs can be studied thanks to geochemical characteristics such as trace metal concentrations. Coupling lead isotopes to elemental geochemistry allows one to decipher between natural (erosion of rocks) and anthropogenic (pollution due to industrial development, vehicles...) inputs. The purpose of our work was to study the pollution history of trace metals in the region of Misten (Belgium) at a local and a regional level, and to place modern industrial pollution in this region in a wider historical perspective.
Four peat cores (01W, 04W, 05W and 06W) were collected in 2008 in the Misten bog (Hautes-Fagnes plateau, E-Belgium) and studied for their trace metal and lead isotopic signatures. Analyses were accompanied by coupled 210Pb-14C age models in order to estimate the mercury and lead accumulation rates in each core and compare them to other European records. The Hg record was compared to the various anthropogenic sources as determined by Pb isotopes. The Hg concentration profiles resemble those of Pb, an element known to be immobile in peatlands. The correlation between these two metals suggests a predominant anthropogenic source of Hg (and Pb).
In the W06 core, low and stable Hg accumulation rates (0.9-3.1 µg m-2 yr-1) are found in the lower layers (503-1823AD). High Hg accumulation rates are found in the surface and sub-surface layers (post-1823AD) and peak at 123.3 µg m-2 yr-1 (1969AD).
In 01W, the lead enrichment factor (Pb E.F.) coupled with the continuous drop in 206Pb/204Pb, 207Pb/204Pb, 208Pb/204Pb isotopic ratios since 539 AD until 1973AD indicates the growing importance of the non-radiogenic Pb released from anthropogenic activities. The highest concentrations of Pb (613-662 $\mu$g g-1) have been found near the surface of the bog dated between 1902 and 1954AD. The Pb E.F. also significantly increased during the Industrial Revolution, and subsequently decreased due to the phasing out of leaded gasoline.
Main results for Pb in 01W and Hg in 06W will be compared with the 2 other cores and previously published results collected in 2007 at another location in the same peatland. Differences in concentrations and chronology will be discussed in terms of (1) differences in the topography of the bog, (2) differences in the surface vegetation of the bog, which could have led to differential trapping and retention of lead, for example, and different retention of vegetation during sampling at the sites where the corers were inserted, (3) different effects induced by the operating mechanism of the corers, (4) operator-induced effects, e.g. leading to loss of surface material before or during coring.