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Sediment characteristics affecting bioavailability of heavy metals in flooding areas and intertidal zones along the river Scheldt

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Mobility and bio-availability of heavy metals in intertidal zones and floodplains is currently studied at the Laboratory of Analytical Chemistry and Applied Ecochemistry (Ghent University). The relation between sediment properties and metal uptake by reed plants (*Phragmites australis* (Cav.) Steudel) was investigated based on field observations at selected locations along the estuary of the river Scheldt (Flanders, Belgium). The sites represented a varying degree of metal contamination and salinity. At each site, reed plants were sampled and analysed for heavy metals. Sediments were also sampled and characterised for metal contents and various physico-chemical properties. Cd contents of *Phragmites australis* (Cav.) Steudel were higher on sites with lower total Cd contents in the upper 20 cm of the sediments. Contents of leaves, stems and rhizomes were however positively and significantly correlated with the chloride content of the sediments. Zn contents were also higher on sites with lower total Zn contents in the sediments, but, in contrast to Cd, were negatively correlated with chloride contents. When the sites with the lowest salinity were considered separately, the Zn content of leaves and stems on the one hand and the ratio of exchangeable Zn to the total cation exchange capacity on the other hand were significantly and positively correlated. This can suggest that reed plants do not take up Zn selectively, and that the uptake and/or transfer mechanism is adapted at the highest salinity.
Cu contents of the plants were negatively correlated with chloride contents in the sediments. However, Cu contents in leaves and stems were significantly and positively correlated with Cu contents in the reducible fraction of the sediments, according to the BCR sequential extraction procedure. At the sites with the largest reducible Cu fractions, the mean water level was also higher and the upper sediment layer was reduced at sampling time.