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Research article

Trace metal concentrations in *Posidonia oceanica* of North Corsica (northwestern Mediterranean Sea): use as a biological monitor?

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Abstract

Background: Within semi-closed areas like the Mediterranean Sea, anthropic wastes tend to concentrate in the environment. Metals, in particular, are known to persist in the environment and can affect human health due to accumulation in the food chain. The seagrass *Posidonia oceanica*, widely found in Mediterranean coastal waters, has been chosen as a "sentinel" to quantify the distribution of such pollutants within the marine environment. Using a technique similar to dendrochronology in trees, it can act as an indicator of pollutant levels over a timeframe of several months to years. In the present study, we measured and compared the levels of eight trace metals (Cr, Ni, Cu, Zn, As, Se, Cd, and Pb) in sheaths dated by lepidochronology and in leaves of shoots sampled from *P. oceanica* meadows collected from six offshore sites in northern Corsica between 1988 and 2004; in the aim to determine 1) the spatial and 2) temporal variations of these metals in these areas and 3) to compared these two types of tissues.

Results: We found low trace metal concentrations with no increase over the last decade, confirming the potential use of Corsican seagrass beds as reference sites for the Mediterranean Sea. Temporal trends of trace metal concentrations in sheaths were not significant for Cr, Ni, Cu, As or Se, but Zn, Cd, and Pb levels decreased, probably due to the reduced anthropic use of these metals. Similar temporal trends between Cu levels in leaves (living tissue) and in sheaths (dead tissue) demonstrated that lepidochronology linked with Cu monitoring is effective for surveying the temporal variability of this metal.

Conclusion: Leaves of *P. oceanica* can give an indication of the metal concentration in the environment over a short time period (months) with good accuracy. On the contrary, sheaths, which gave an indication of changes over long time periods (decades), seem to be less sensitive to variations in the metal concentration in the environment. Changes in human consumption of metals (e.g., the reduction of Pb in fuel) are clearly reflected in both organs. These results confirm that *P. oceanica* is a good bioindicator of metals and a good biomonitor species for assessing Cu in the environment.