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Spatial variation of butyltins in an intermittent French River

N. Chahinian (1), C. Bancon-Montigny (2), V. Brunel (2), and MG. Tournoud (2)

(1) IRD, Laboratoire HydoSciences Montpellier, Université Montpellier 2, Place Eugène Bataillon, 34095 Montpellier Cedex 5, France (chahinian@msem.univ-montp2.fr), (2) Université Montpellier 2, Laboratoire HydroSciences Montpellier, Place Eugène Bataillon, 34095 Montpellier Cedex 5, France

Organotins (OTs) have been increasingly used in industrial applications because of their thermoresistant and biocidal properties: in the 1970s and 1980s Tributyltin (TBT) based anti-fouling paints were used on ships and vessels of all kinds. However, studies pointed out the highly toxic nature of these compounds and their active role as an endoctrine perturbator. This lead the EU to ban the use of TBT paints in 2003. The toxicity of OTs combined to their widespread use has lead then to be included in the priority list of the EU water framework directive. Organotins are prone to adsorption, can bond easily to particulate matter and “migrate” from the water column unto the sediments where their half-life can extend to a few decades. Consequently sediments can become important organotin stores and release OT compounds during dredging operations, storms, tides or floods.

The main objective of this work was to investigate the presence of organotin compounds in the sediments and water column of an intermittent river reach i.e. to establish the presence of organotins in regular flow conditions and assess their spatial variability. The study zone is a reach of the Vène River located in southern France. The Vène is a major tributary of the Thau lagoon which is an important shellfish farming site and thus very vulnerable to OT contamination.

Butyltin, trace metal and dissolved organic carbon (DOC) concentrations were measured on water and sediment samples collected over a 3 month period stretching from March to May 2008. The results revealed the presence of butyltins at concentrations exceeding the EU and French pollution limits. In terms of spatial variability, by combining the butyltin and the trace metal results at 16 locations along the reach, two point pollutions spots were identified, namely a sewage treatment plant and a drainage ditch. However, the later are not the only OT input sources, the results of the sediment analysis pointed out to a diffuse pollution throughout the length of the reach. Finally, flow and concentration values were used to calculate the potential export rate of butyltins from the reach during the spring months.