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# Distribution and speciation of trace metals and organic matter in brackish lakes on karstic island, South Adriatic Sea, Croatia

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On small karstic coastal island of Mljet in the South Adriatic Sea, Croatia, brackish lakes are the major source of fresh water.
Mljet Island has not been connected with mainland water supply network and there is no surface watercourse of fresh water. In some areas on the island, water stays permanently on the surface forming small lakes created by sea level rising in postglacial period. These lakes are connected hydrologically with Adriatic Sea surface water through porous karstic structures. Therefore, water is brackish with salinity range between 1 and 25, depending on vicinity and connection to the seawater and the season. Distance of the lakes from the surface seawater is from 100 m to 1500 m. Local communities use lakes for irrigation of agricultural areas. Distribution and speciation of ecotoxic trace metals (Hg, Tl, Cd, Pb, Cu, Zn, Ni, Co) in water column, sediment and surrounding soil of three small brackish lakes (Blatine, in local terms) were assessed. It is important to determine biogeochemical processes occurring in these brackish water systems, as well as to found out the origin of contaminants present. Due to this, also the characteristics of organic matter in the brackish lakes were evaluated. Thallium and mercury concentrations in the lake waters were up to two orders of magnitude higher compared to ranges found in the adjacent coastal seawater. Results suggested that elevated concentrations of thallium were of anthropogenic origin due to usage of rodenticide in the past, while mercury concentration was naturally enhanced. Levels for the other metals were characteristic of uncontaminated water systems. Speciation modelling showed that dissolved trace metals Cu, Pb and Zn were mostly associated with organic matter, while Tl, Co and Ni were present predominantly as free ions and inorganic complexes. Organics were characterized by the determination of the complexing capacity for Cu ions (CuCC), surface active substances (SAS) and catalytically active compounds (CAC). Reduced sulphur species (RSS) (glutathione and other thiols) were determined as well. They represent significant amount of Cu binding ligands.
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