Influence of chemical parameters on geochemical dynamics in the water column

HAOUCHINE A.[1], ZOCCATELLI R.[2], MOTELICA-HEINO M.[2], NEDJAI R.[1], DEFARGE C.[3], JOZJA N.[3], GUIRIMAND-DUFOUR A.[3]

[1] Université of Orléans UFR LLSH 10 rue de tours 45065
amina.haouchine@etu.univ-orleans.fr
rachid.nedjai@univ-orleans.fr
[2] CNRS/ISTO, 1A rue de la Férollerie, 41071 Orléans
mikael.motelica@univ-orleans.fr
renata.zoccatelli1@univ-orleans.fr
[3] CETRAHE/Polytechnique Orléans, 8 rue L. de Vinci 45072
christian.defarge@univ-orleans.fr, nevila.jozja@univ-orleans.fr, audrey.guirimand-dufour@univ-orleans.fr

The ponds of Brenne (France) by their large number and their organization in ponds chain and also by exploitation for fish farming are very fragile socio-ecosystems. They thus see their biogeochemical cycles modified most often under the duress of hydrological regulation of anthropic character.
Monthly water column samplings were made on three contrasted ponds (Thomas, Neuf and Pifaudière) over a period of one year, at different depths and at different points of the water body.
Results show seasonal variations for organic carbon, major elements and nutrients including trace elements especially for two headponds (Thomas and Pifaudière) because of their geographical position.
Conversely, the pond Neuf is characterized by relatively high contents of Ca, Mg, Na and K because of its receptacle position collecting the water of several ponds located upstream and the importance of the watershed drained.
The NH4 contents of Pifaudière pond were significantly higher (0.89 mg / l) unlike the other two ponds which are 0.01 mg / l and 0.048 mg / l respectively for Thomas and Neuf.
Parallel to that, the contents of NO3 and SO4 remained significantly higher compared to the other elements.
The consideration of the main physico-chemical parameters, in particular temperature together with organic matter cycling, largely explains the alternate passage (stratification-destratification) of the water column and the subsequent desoxygenation, especially during summer giving rise to repeated remobilization of trace elements (Fe, Mn, Cu and Zn)in the deep layers of the body of water (hypolimnion).
Keywords: hydrogeochemistry, water column, ponds, organic carbon, nutrients, trace elements.