Geophysical Research Abstracts
Vol. 15, EGU2013-5467, 2013
EGU General Assembly 2013

Spatial variability of solutes in stream water of the Anoia river basin

Elena Rallo (1), Edinson Pacheco (1), Xavier Úbeda (1), Joaquim Farguell (1,2)

(1) GRAM, Department of Physical Geography, University of Barcelona, Barcelona, Spain (rallo@ub.edu), (2) Regulation and Control Infrastructures Department. Catalan Water Authorities, Barcelona, Spain (jfarguell@ub.edu)

The main aim of this study is to describe and understand the spatial variability of dissolved sediment in the Anoia river stream water: a Mediterranean basin under different land uses and economical activities.
The Anoia river (926 km2) is a tributary basin of the Llobregat river (4900 km2), located in Catalonia, in the northeastern part of the Iberian Peninsula. Mediterranean climate type dominates the study area. The average flow near the river mouth is 2.37 m3/s and closely follows the rainfall pattern: monthly maximum discharges occur during spring months, while in summer they decrease drastically. Instantaneous peak discharges are the highest during autumn months (highest peak of the last ten years was 92 m3/s, registered in November 2011). Lithology is mainly sedimentary, being mostly marls, sandstones and gypsum in the upper part, and limestone and conglomerates domain the lower part. Land uses are varied: headwaters are basically occupied by lawns, dry winter cereal, and well structured riparian forests. The lower part of the basin is influenced by intensive vineyard agriculture, industry and major urban areas.
Water sampling has been made on a fortnightly basis at five gauging stations during the hydrological year 2011-2012. Flow and water temperature were measured in situ, while electrical conductivity, total dissolved solids, pH, suspended sediment concentration and NO_3-, $NO_2$2-, PO43- and $HCO_3$2- contents were determined at the Physical Geography laboratory of the University of Barcelona. Major cations are derived from analysis by ICP-MS technique by the Scientific-Technical Services of the University of Barcelona.
Preliminary results show that there exists a remarkable spatial variability of solutes throughout the basin: maximum electrical conductivity values nearly reach 4000 μS/cm at headwaters, while close to the outlet the highest levels do not exceed 2400 μS/cm. However, tributaries coming from groundwater sources always keep rates around 1000 μS/cm. At the same time, conductivity values of 1000 μS/cm are related to a solute concentration of 500 mg/l, while magnitudes close to 3000 μS/cm relate to concentrations around 1600 mg/l. Thus, correlations between conductivity data and solute concentrations allow us to verify the great spatial variability possibly due to the nature of the underlying bedrock. According to the obtained data, we can distinguish three main areas to characterize the basin: a combined natural (non anthropic)-agricultural zone at the head of the basin; natural areas (basically forested areas) at the southwestern areas; and a mixture of agricultural-industrial-urban lands in the lower course of the catchment.
The 2011-2012 water year has been particularly dry, for this reason it is necessary to continue the study for at least one more year, to find out whether the spatial variability of conductivity is kept, or if otherwise, other spatial patterns are discovered. Once we record more data, we could be able to start considering the temporal behavior of solutes.