SPATIAL VARIABILITY OF SOLUTES IN STREAM WATER OF THE ANOIA RIVER BASIN

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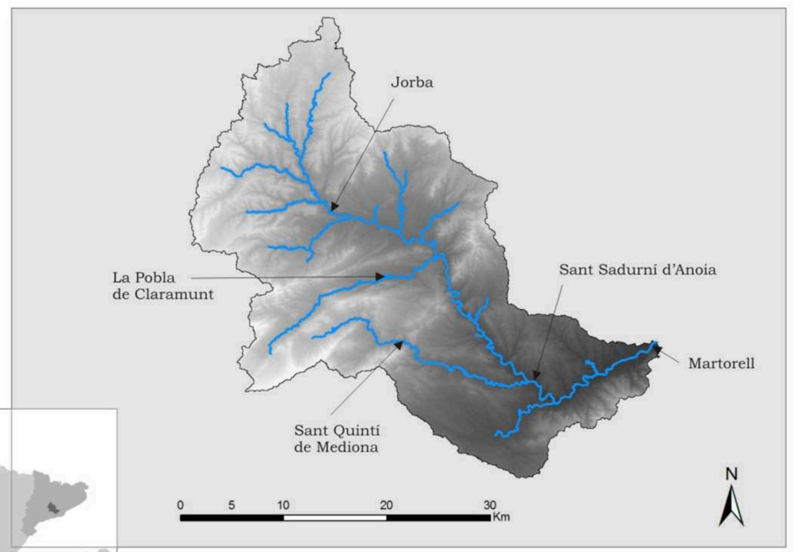
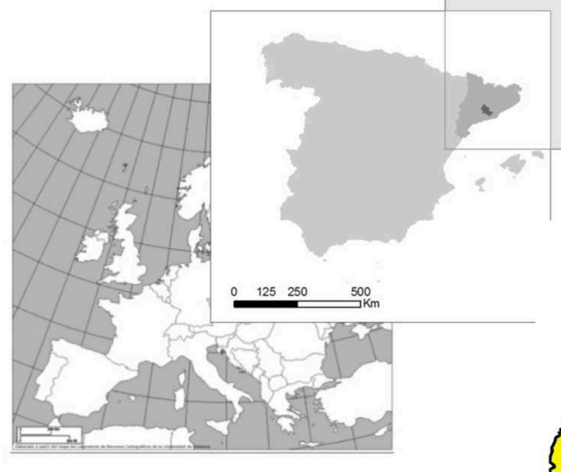
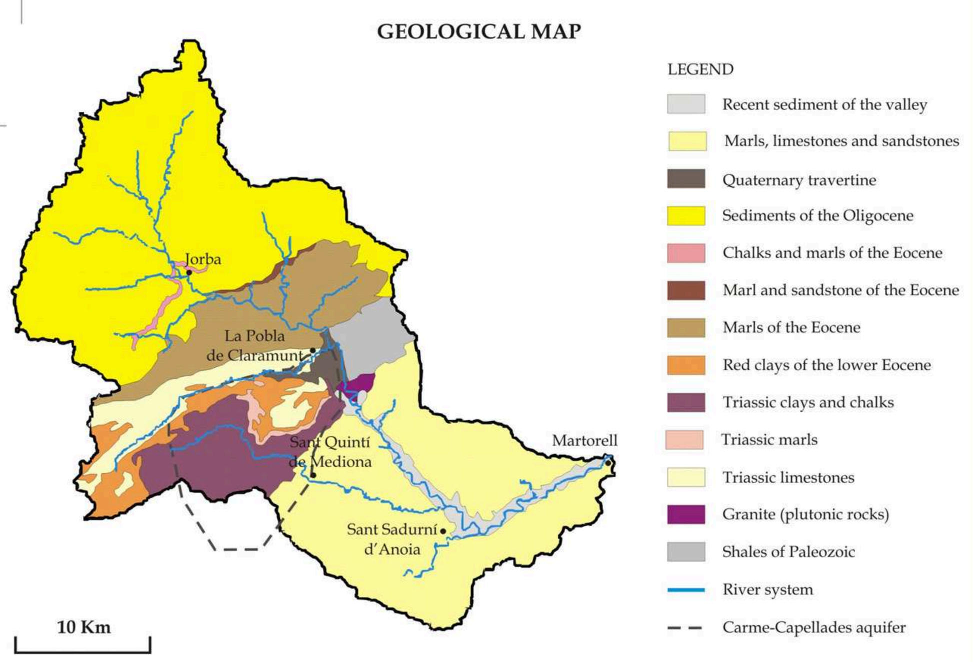
1. STUDY AREA

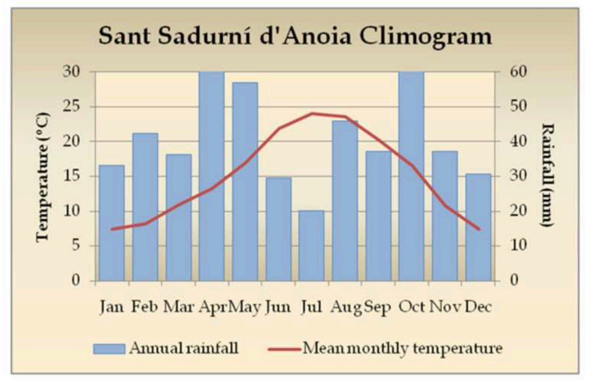
Location: North-East of the Iberian Peninsula, Catalonia, Spain

Area: 926 Km2









PHYSICAL GEOGRAPHY

Materials are mainly sedimentary

Climate follows Mediterranean patterns

Hidrology data: average flow is of 2.37 m^3/s near the river mouth

The Carme-Capellades aquifer provides water all year

LAND USES

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.

2. METHODOLOGY

FIELDWORK

Fortnightly manual water sampling at 5 sections of the Anoia river basin during the hydrological years 2011-2012 & 2012-2013.

All sampling points have gauging stations, that manage the Catalan Water Authorities.

Thus, flow and water temperature are measured in situ.

LAB ANALYSIS

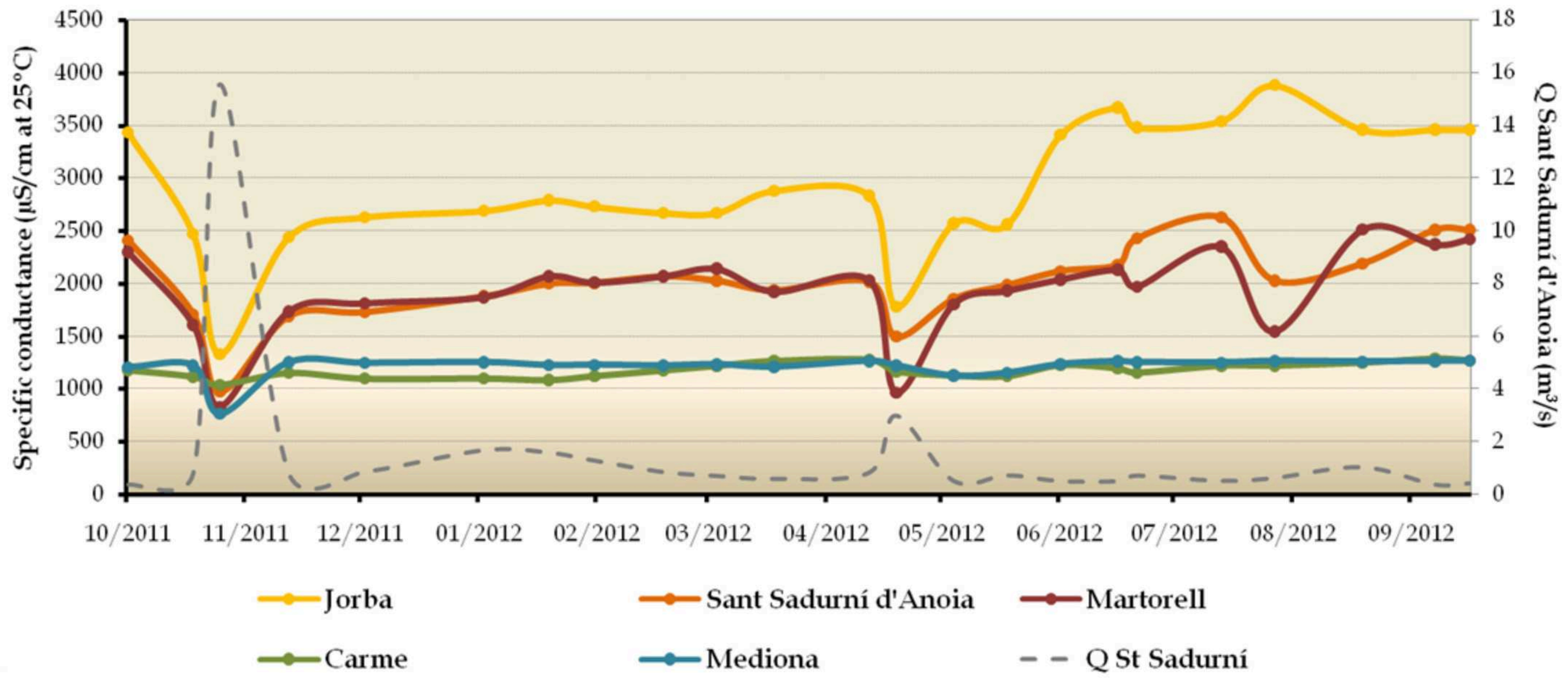
Specific conductance, total dissolved solids, pH, suspended sediment concentration and NO_3^-, NO_2^{2-}, PO_4^{3-} & HCO_3^{2-} contents were determined at the Physical Geography laboratory of the University of Barcelona (UB).

Major cations are derived from analysis by ICP-MS technique by the Scientific-Technical Services of the UB.

3. PRELIMINARY RESULTS

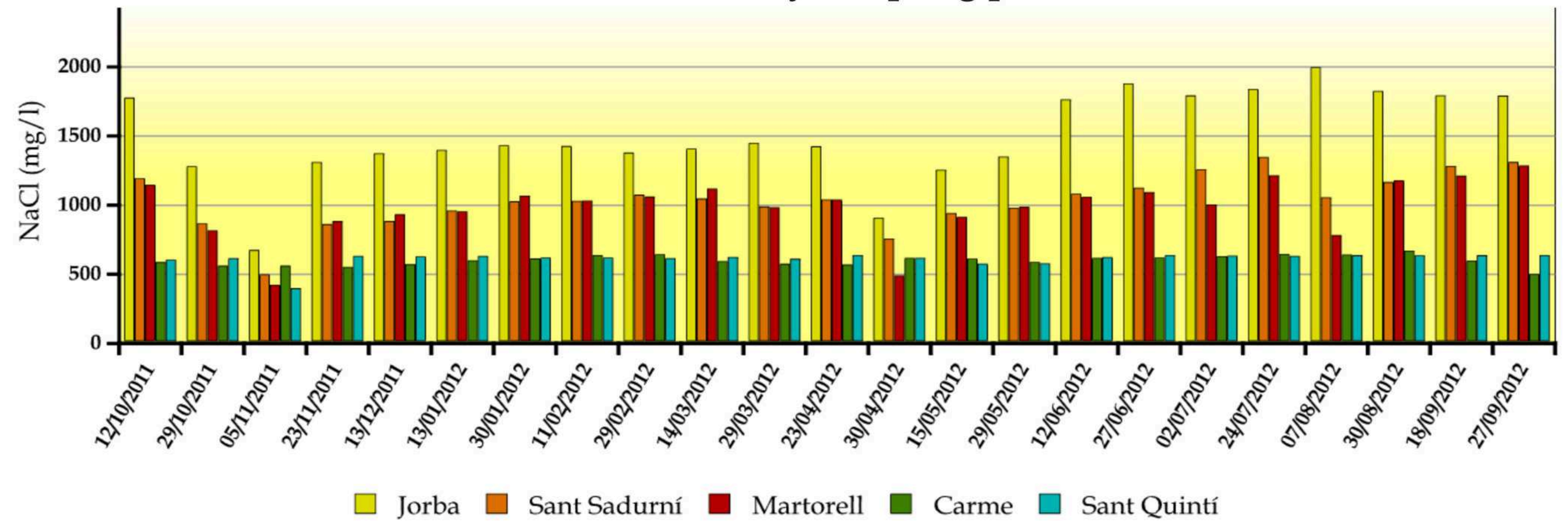
3.1. Specific conductance of the Anoia stream water

Distribution by sampling points during the 2011-12 hydrological year



3.2. Solute concentrations in the Anoia stream water

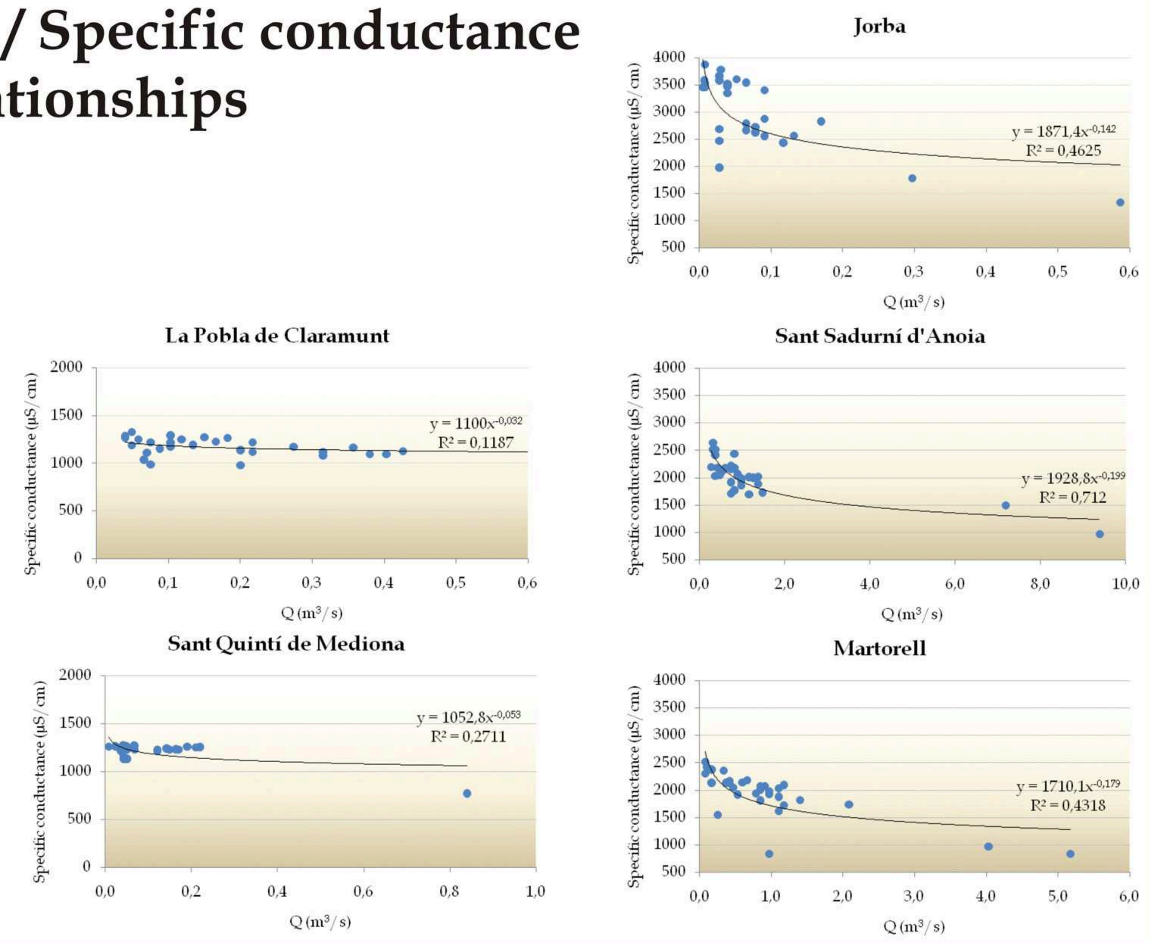
Distribution by sampling points



3.3. Stream flow / Specific conductance relationships

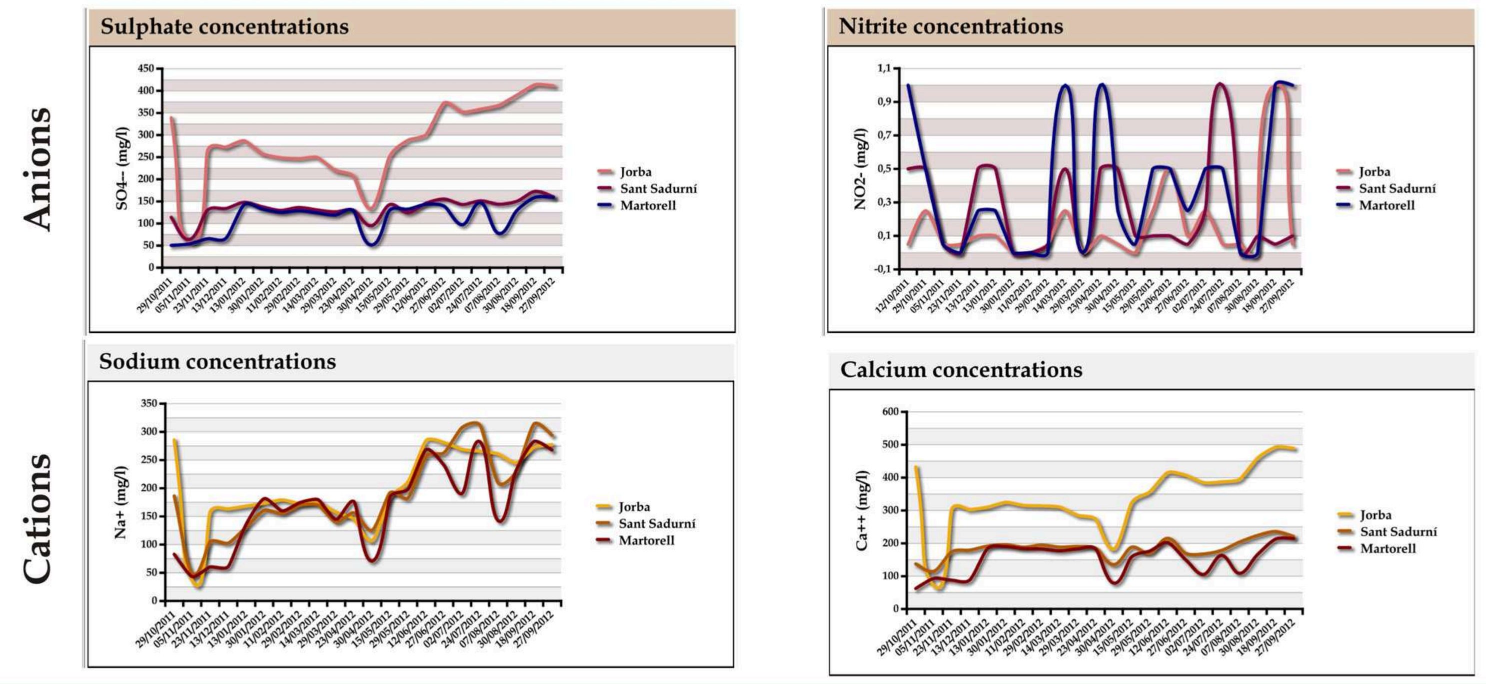
Correlations between stream flow (Q, m^3/s) and specific conductance (µS/cm) have been made to understand how total dissolved solids (TDS) vary according to water level (Walling & Webb, 1983).

Potential regression line in the graphics show the same trends at the sampling points of the main channel, but tributaries don't follow this pattern.



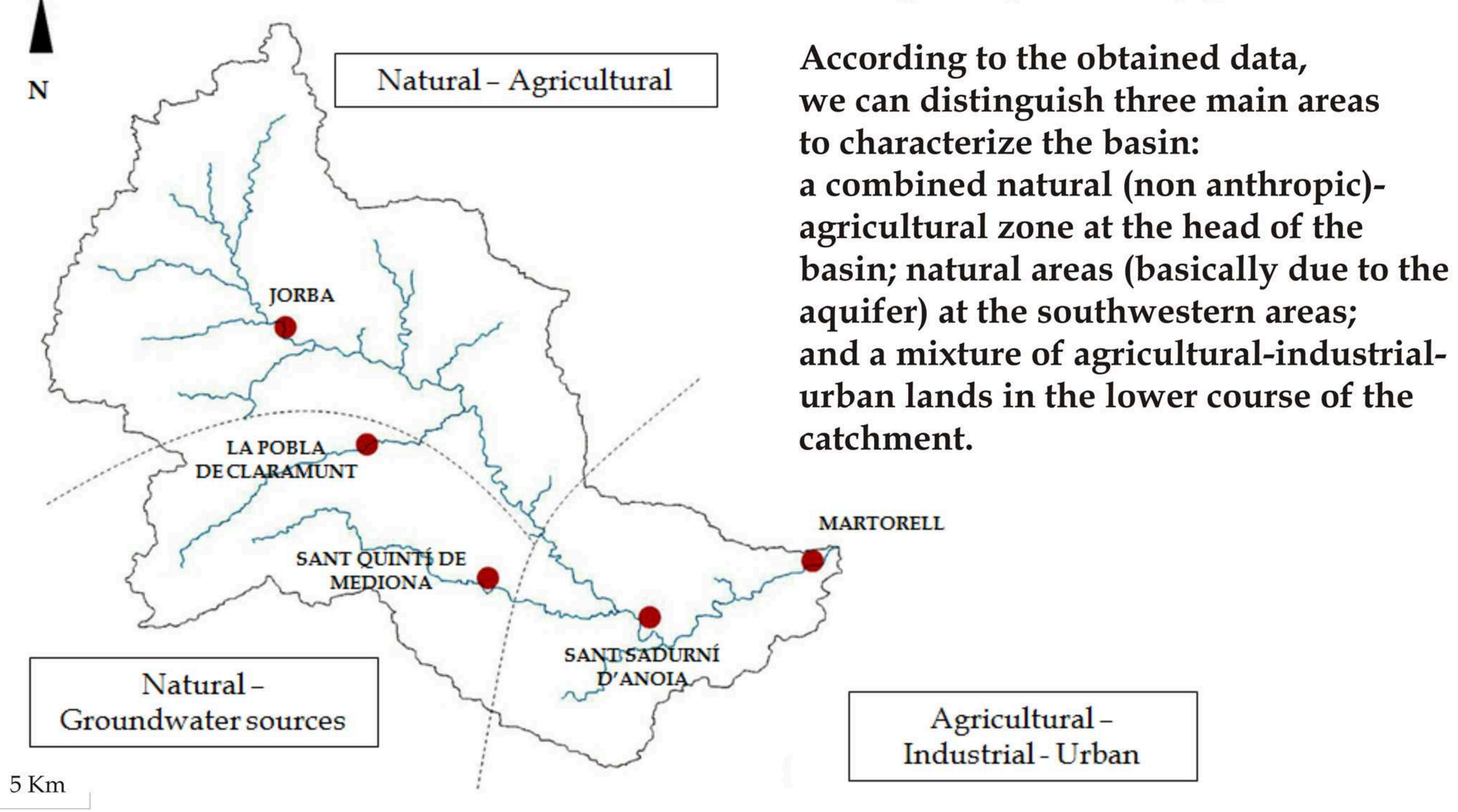
3.4. Major ions behaviour

Most solute concentrations are reduced when stream flow increases. Even so, there are some specific particles that don't answer to these natural events, like it is shown in the graphics below: while major anions like sulfates appear like naturally part of the river, nitrites don't follow any specific behaviour throughout the year. Major cation sodium also presents non-natural behaviour, while calcium follows TDS trends.



4. CONCLUSIONS

A first geospatial typification



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 due to the aquifer) at the southwestern areas; and a mixture of agricultural-industrial-urban lands in the lower course of the catchment.

Further research is needed to find out whether the spatial variability of solutes is kept, or if otherwise, other spatial patterns are discovered.
Once we record more data, we will be able to start considering the temporal behavior of solutes.

REFERENCES

Walling, D. E. i Webb, B. W. (1983). The dissolved loads of rivers: a global overview. Dissolved Loads of Rivers and Surface Quantity/Quality Relationships (Proceedings of the Hamburg Symposium, August, 1983). IAHS Publ. No. 141, p. 3-19.

ACKNOWLEDGMENTS

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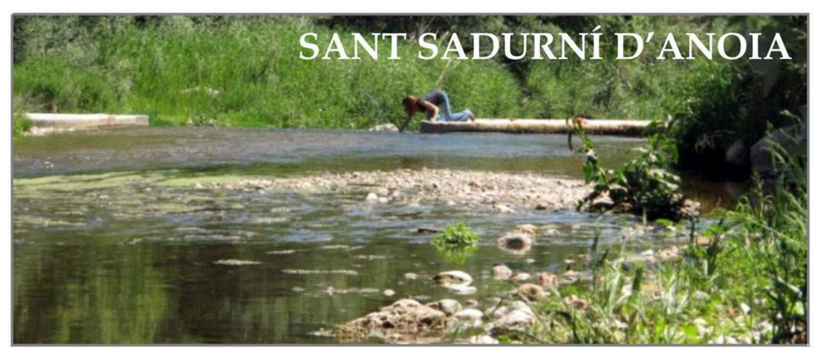

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