

## **USE OF STREAM SEDIMENT CHEMISTRY TO PREDICT GROUNDWATER CHEMISTRY. THE BISAGNO VALLEY (GENOA, ITALY) CASE STUDY**

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During the last years sampling and analysis of groundwaters and stream sediments have been carried out in Liguria region. In addition to assess the geochemical baselines in geological materials, new data are of value to get indications on the water-rock interaction processes. For instance, stream sediment data can be used to pre-dict the chemical composition of local groundwaters.

First it was shown that the geographical distribution of several chemical elements in the sampled fraction of active stream sedi-ments is essentially controlled by the lithology of the outcropping formations. Stream sediments are, therefore, representative of the rocks cropping out in the related catchments.

Then, the irreversible water-rock mass transfer governing the evolution of rainwaters to groundwaters was simulated through re-action path modeling in reaction progress mode. The precipitation of a limited number of secondary mineral phases, including chalce-dony, illite, a smectite solid solution, a hydroxide solid solution, a trigonal- and an orthorhombic-carbonate solid solutions, was en-abled. Concentrations of major elements and several trace ele-ments in water were simulated with good approximation.

The important role played cal-cite as sequestrator of some trace elements (Mn, Zn, Cu, Co, Cd and possibly Pb) was empha-sized. Since calcite precipitation is fast, equilibrium incorporation of trace elements in calcite might be an effective process regula-ting their concentrations in shallow groundwaters. This process probably represents a long-term buffer, whose action is perturbed by short-term, temporary buffers under non-steady state condi-tions, e.g., sorption on solid matters and cation exchange.