Natural and Anthropic Pollutants Affecting Water Quality of the Etnean Area (Italy)

1D'ALESSANDRO, W., 2AIUPPA, A., 2BELLOMO, S., 2BRUSCA, L. and 2PARELLO, F. 1Istituto Geochimica dei Fluidi, C.N.R., Palermo, Italy; 2Dipartimento CFTA, University of Palermo, Italy

Mt. Etna, the largest active volcano in Europe, is about 3300 m high and covers an area of about 1200 km2. Due to its peculiar climatic conditions with respect to the nearby areas, its flanks are also the site of huge groundwater circulation. Its aquifers are hosted in the highly permeable, fractured volcanic rocks of alkali-basaltic composition lying on impermeable tertiary and quaternary sedimentary deposits. Such hydrogeologic conditions limits the depth of circulation and also thermalisation of the waters.

Dissolution of magmatic CO2 enhances the aggressiveness of groundwater towards the rocks of the aquifer so that cations are gradually brought into solution. In some areas of the volcano such mechanism causes the exceeding of maximum admissible concentrations in drinking waters for elements such as B, Na, Mg, Mn, Fe, V. In these areas hydrogeological conditions increase residence time of the waters thus enhancing gas-water-rock interaction.

The flanks of Mt. Etna are also highly inhabited and intensely cultivated. This implies a great exploitation of its groundwaters for irrigation and also contamination with synthetic fertilisers. The highest nitrate concentration are found at the lower flanks were cultivation is more intense and the aquifer is much vulnerable. An exception in this sense is the area of Patern•, were negative redox conditions enhances denitrification processes.