Geophysical Research Abstracts
Vol. 17, EGU2015-9889-1, 2015
EGU General Assembly 2015

Mapping groundwater quality distinguishing geogenic and anthropogenic contribution using NBL

Elisabetta Preziosi (1), Daniela Ducci (2), Maria Teresa Condesso de Melo (3), Daniele Parrone (1,4), Mariangela Sellerino (2), Stefano Ghergo (2), Joana Oliveira (3), and Luis Ribeiro (3)

(1) CNR - Water Research Institute, Monterotondo (Rome), Italy, (2) Università degli Studi di Napoli Federico II, Naples, Italy, (3) CVRM, Department of Civil Engineering, Architecture and Georesources (DECivil), IST, University of Lisbon, Lisbon, Portugal, (4) University RomaTre, Rome, Italy

Groundwaters are threatened by anthropic activities and pollution is interesting a large number of aquifers worldwide. Qualitative and quantitative monitoring is required to assess the status and track its evolution in time and space especially where anthropic pressures are stronger. Up to now, groundwater quality mapping has been performed separately from the assessment of its natural status, i.e. the definition of the natural background level of a particular element in a particular area or groundwater body. The natural background level (NBL) of a substance or element allows to distinguish anthropogenic pollution from contamination of natural origin in a population of groundwater samples. NBLs are the result of different atmospheric, geological, chemical and biological interaction processes during groundwater infiltration and circulation.

There is an increasing need for the water managers to have sound indications on good quality groundwater exploitation. Indeed the extension of a groundwater body is often very large, in the order of tens or hundreds of square km. How to select a proper location for good quality groundwater abstraction is often limited to a question of facility for drilling (access, roads, authorizations, etc.) or at the most related to quantitative aspects driven by geophysical exploration (the most promising from a transmissibility point of view). So how to give indications to the administrators and water managers about the exploitation of good quality drinking water? In the case of anthropic contamination, how to define which area is to be restored and to which threshold (e.g. background level) should the concentration be lowered through the restoration measures?

In the framework of a common project between research institutions in Italy (funded by CNR) and Portugal (funded by FCT), our objective is to establish a methodology aiming at merging together 1) the evaluation of NBL and 2) the need to take into account the drinking water standards with a spatial analysis. We compare diverse case studies using geochemical maps built by kriging in which we interpolate the conditional probability of exceeding the reference value (i.e. the drinking water standard) OR the local natural background level. The resulting maps provide a useful reference for management purposes.