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Extended Abstracts

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Data processing in hydrogeology

5.1
Modelling as a tool of groundwater assessment

title: **New approach to characterize a contaminant area and to investigate about the source of pollution: a case study in Province of Treviso, Northeast Italy**

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In the Municipality of Arcade (Treviso Province), since 2002 (first monitoring year) there has been knowledge of a persistent contamination of perchlorethylene (PCE) in a private well. The concentration has been around 30–40 µg/L and the trend has been constant until now, without other evidence in nearby wells.

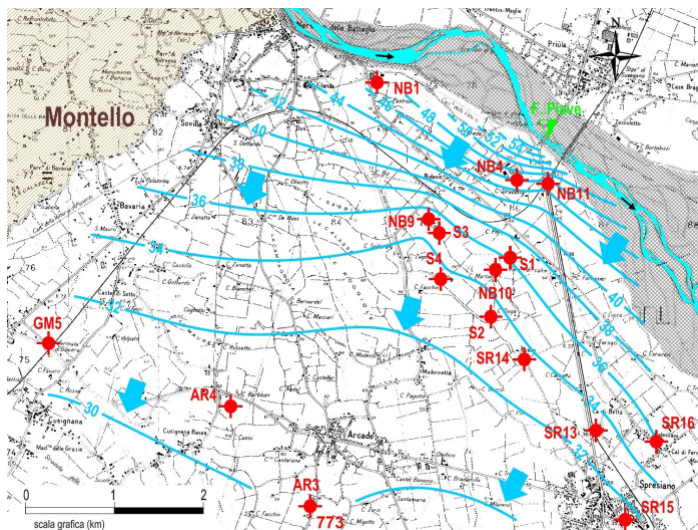


Figure 1. Hydrogeological map of the study area.

The study area is located in Veneto alluvial plain (Fig. 1) and is characterized by sandy gravel alluvium deposits with high values of hydraulic conductivity (10^{-1} – 10^{-3} cm/s) where an unconfined aquifer exists (groundwater depth = 20–30 m below ground level). Locally there are some aquitards composed by silty-clay layers or cemented gravel.

In 2009 the site became a pilot site for the European project FOKS (Focus on Key Sources of Environmental Risks) and this paper focus on some new tools and strategies developed by recent researches here applied.

The project deals with the detection of the source of contamination that produced the groundwater pollution and with tries to determine priorities and investigative methods for remediation. The main objective of this initiative is finalizing a method of approach and characterization of remediation for the polluted freatic aquifer, which will allow to focus on main sources of contamination even through the use of new tools and a risk management system. In the study area the investigations consist of using innovative techniques like Integral Pumping Test (IPT) or Passive Sampling to elaborate a conceptual model of the site, by mean of the flow and transport modelling.

The integral groundwater method is used for the quantification of contaminant mass flow rates. In this approach, pumping wells is positioned along planes perpendicular to the groundwater flow direction and work for a certain interval of time and sampled for contaminants. The concentration time series of the contaminants measured during operation of the pumping wells are then used to determine contaminant mass flow rates, average concentrations and the plume shapes and positions at the control planes. The zones emitting the highest PCE mass flow rates could be determined, representing the areas where additional investigation and remediation activities will be needed.

In order to optimize the research planning, the proposed approach has been differentiated in three scale field which correspond to more exhaustive surveys: the underlying scheme (Fig. 2) shows the activities managed within the project.

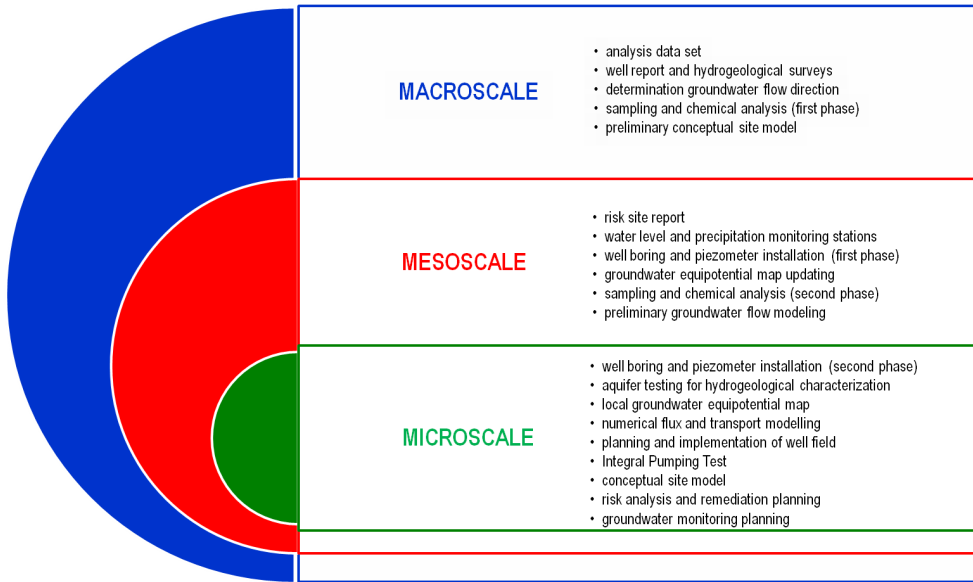


Figure 2. Survey preliminary schedule.

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