



## **Environmental conditions and management of the underground resources in the western sector of Tagliamento River (northern Italy)**

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In order to define the management strategy for the qualitative and quantitative conservation and protection of the underground resources of Friuli region (NE Italy), a pilot area delimited by the Tagliamento, Cellina-Meduna and Livenza Rivers has been selected. Firstly, the analysis of hydrological, hydrogeological and stratigraphical data allowed to define the principal aquifer system and their geometric characteristics. Secondly, in situ measurements of the piezometric level and of the chemico-physical parameters (pH, electrical conductivity, temperature) were performed to define the hydrodynamic and hydrochemical behaviour of the aquifers. The integrated analysis of the data emphasised that the investigated area is characterised by the occurrence of two distinct hydrogeological systems developed respectively north and south of the spring belt. In particular, the hydrogeological system north of the springs is characterised by an unconfined aquifer with a variable thickness (between 20 and 100 m from the field surface) and consisting of coarse-grained deposits, like conglomerates and sands. The principal feeding source of this aquifer is from meteoric precipitations and from lateral infiltration from the Tagliamento River. Due to the high porosity of these materials, this aquifer body is highly vulnerable to potential superficial polluting sources. South of the spring belt, a multi-aquifer system is developed consisting of a superficial unconfined aquifer and several deeper confined aquifers mainly within sandy deposits. The hydraulic potential of the deeper aquifers is highly variable. The different confined aquifers are generally hydraulically separated by clay or silt-rich layers. The thickness and the frequency of lenses and/or layers consisting of fine-grained materials show a general increase from the spring belt toward Torrate. The major feeding source of the unconfined aquifer is from the meteoric precipitations and by infiltra-

tion from the Tagliamento River, while for the deeper aquifers the feeding process is mainly due to lateral infiltration from the undifferentiated aquifer. The chemical analysis of the water allowed also to recognise and distinguish the principal geochemical facies and the influences of the human activities on the water quality. Finally, the installation of multiparametric sensors in the Torrate aqueduct network, will enable us to a continuous monitoring of the water depth and of the chemical-physical parameters of the aquifers system and therefore to understand the influence of the exploitation of the aquifer on the qualitative and quantitative characteristics of the whole system.