



Hydrogeological and geochemical characterization of Orvieto Cliff. Some instance of isotope application

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The City of Orvieto (Central Italy), located on the homonym cliff, it represents an example of "fragile city"; problems of instability connected to the lithological and morphological characteristic of the cliff have been studied and broadly faced during previous researches. The present job has therefore understanding to introduce the results of a hydrogeological investigation, which has taken in examination all the present emergencies (springs) along the slopes of the hill of Orvieto or at the base of the tuffaceous Cliff, included the "Well of S. Patrician", located instead inside the urban perimeter. The investigation is taken place in the years 1998-1999 on application of the Umbria Region, within the jobs of consolidation of the tuffaceous cliff, and it has served to reform the scheme of recharge of various springs and the main chemical-physics characteristics of the waters. During these years all the present springs in the area - with monthly measures of chemical and phisical parameters such as temperature, discharge and electric conductivity have been took into examination. Furthermore, isotopic content of spring waters and of "well of S. Patrician" situated in the urban perimeter have been carried out, with the goal to define the hydrogeological and geochemical context of the Orvieto area. These isotopic values point out that there is no differentiation in the circulating waters in the tuffaceous mass, and that the recharge of the various springs originates from local rain water. Such investigation has underlined that waters are all of meteoric origin, with infiltration and slow percolation in the piroclastic mass of the Cliff and in the underlying permeable clastic level of lacustrine origin, until to reach the impermeable basal clays, which constitute the horizon on which he plans the groundwater. Finally, the isotopic analyses of the nitrogen-15 performed on water's sample withdrawn from springs, have underlined a potential

mineralogical origin for the actual nitrates (NO_3^-) found in great amounts in some springs.