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WATER-BUDGET AS A TOOL TO EVALUATE THE SUSTAINABLE USE OF GROUNDWATER RESOURCES (ISONZO PLAIN, NE ITALY)

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Climate change and the necessity to preserve and provide good quality freshwater for human consumption has led researchers to study the aquifers of the Friuli Venezia Giulia Region (NE Italy) in more detail. Of particular interest is the Soča/Isonzo River basin, which contributed to the creation of a remarkable alluvial aquifer. The mountain basin of the Soča/Isonzo River extends into Slovenia and has an area of 1500 kmq. After about 100 km the river reaches the Isonzo plain. Before outflowing into Italian territory, the Salcano dam in Slovenia regulates its discharges. Once in the plain, the Isonzo leakages contribute to the recharge of an extensive alluvial unconfined aquifer, which evolve southward into a multi-layered confined aquifer before outflowing into the Adriatic Sea after 40 km. The aquifers greatly differ from a textural viewpoint: the northern part of the plain, the so-called High Plain, is more gravelly, while the Low Plain in the southern part, mainly consists of finer deposits that go from gravel to sand and silty sand.

Today more than 300.000 inhabitants are supplied by water withdrawals from AcegasApsAmga Hera Group and the IrisAcqua water companies, the water wells of which are located in the southern part of the High Plain. Taking into consideration the importance of this area for the inhabitants of the provinces of Gorizia and Trieste, in order to guarantee the sustainability of the actual use of the water resource, the necessity has arisen to compute a groundwater balance. The leakages of the Soča/Isonzo River and the effective infiltrations constitute the water balance input parameters. Outflow, evapotranspiration, spring discharges and groundwater withdrawals estimated for each type of use and for each aquifer system have been evaluated.

Withdrawal entity, resurgence belt discharge, phreatic levels and confined aquifer pressure are closely interdependent and in dynamic equilibrium. The sustainability of the actual use of the resource comes from the consistency and ratio between recharge and withdrawals. The more detailed and precise the input values in the water balance are, the more conscious is the management and safeguarding of this precious resource, avoiding pauperization in terms of quantity but especially quality.

Within the framework where trends in rising temperature are clear, (2014 and 2015 were the hottest years of the last century), trends in precipitation are not clearly indicated, groundwater balance can be understood as a starting point for any future planning.