

Water Resource Management in Inland and Coastal Areas: Results Of Cooperation Between Italy and Argentina on Qualitative and Quantitative Issues of Groundwater and Surface Water Interactions.

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Sustainable use and management of water resources require scientific knowledge about aquifer recharge processes, the interactions between groundwater (GW) and surface water (SW), and accurate estimates of the water budget. These issues are increasingly in the attention of water resource managers, given the growing demand for water for various uses, unavoidable environmental needs, and ongoing climate change effects. The EU Water Framework Directive (WFD 2000/60/EC), to preserve the environmental quality and quantity of water bodies, proposes a holistic approach to reviewing the water budget, considering groundwater and surface water as a single resource. In the framework of the CUIA initiatives (Consorzio Interuniversitario Italiano per l'Argentina), this work illustrates the results arising from the scientific cooperation between the University of Perugia, University of Naples Federico II, and Universidad Nacional de La Plata (Argentina) on topics related to aquifer recharge processes and groundwater-surface water interactions, examining qualitative and quantitative aspects of inland and coastal areas, at different spatial-temporal scales. The application of these aspects in some regions of Italy (the Nera River basin, Umbria, and the Tyrrhenian coastal plains and the carbonate aquifers of Campania) and Argentina (coastal area of the Río de La Plata and the Atlantic Ocean, and Pampean and Puelche aquifers), exploited for multiple uses of water, allow the exchange of experiences and methods on hydrogeological systems with different anthropogenic and environmental needs. In all investigated aquifer systems, the pressure on groundwater and surface water bodies is high, including decreasing recharge, increasing water demand (inland areas), seawater intrusion, or natural/anthropogenic pollution into coastal aquifers. The sharing and integration of hydrogeological information are

particularly useful, considering that some methods proven in specific meteorological-climatic, lithological, morphological, and ecological contexts may not be well represented in other hydrogeological systems. The research aims to promote multidisciplinary studies to understand recharge processes better and strengthen the cooperation between the two countries, focusing on groundwater-surface water interactions in inland and coastal environments.