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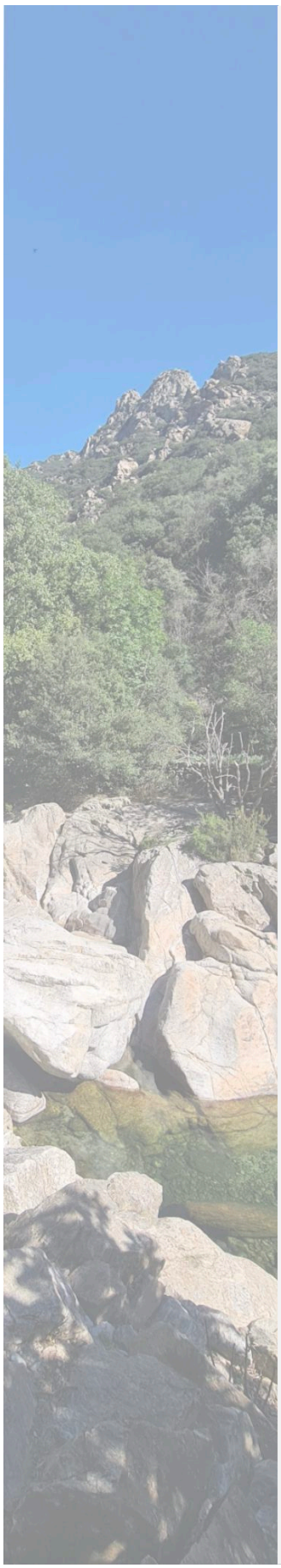

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18.05.2026
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Herr PhD Prof. Pantaleone De Vita

Department of Earth, Environmental and Resource Sciences (DiSTAR) – University of Naples Federico II

Karst Aquifers of Southern Apennines: Hydrogeology, Groundwater Recharge Dynamics and Impact of Climate Scenarios

Karst aquifers of the Southern Apennines represent hydrogeological systems of primary importance for water supply, baseflow regulation, and the conservation of groundwater-dependent ecosystems. These aquifers develop within thick Mesozoic carbonate series composed mainly of limestones and dolostones, intensely fractured and karstified and characterized by high structural and hydraulic heterogeneity. Due to the structural setting of the Southern Apennines Chain, these aquifers form the major mountain ranges and are characterized by autonomous groundwater circulation feeding huge basal springs. Understanding groundwater recharge processes is therefore essential for assessing groundwater availability and aquifer vulnerability under climatic and environmental change.

The effects of global climate change are superimposed on this natural variability. Regional climate projections indicate increasing air temperatures, decreasing precipitation, and greater rainfall irregularity throughout the twenty-first century. Under both analyzed emission scenarios, effective precipitation shows negative trends, suggesting a significant reduction in the potential recharge of carbonate aquifers. These reductions are more pronounced under high-emission scenarios, implying increased frequency and duration of water-stress conditions.

Overall, the carbonate aquifers of the Southern Apennines emerge as highly sensitive systems to climatic and environmental change. The interaction between carbonate bedrock, pyroclastic covers, land use, and climate variability controls recharge dynamics across multiple spatial and temporal scales. Integrated assessment of these processes through climatic analyses and hydrological modeling is essential for sustainable groundwater-resource management and climate-change adaptation in Mediterranean karst environments.