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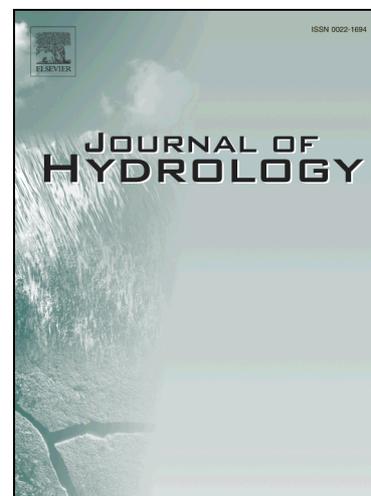
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## GROUNDWATER LEVEL RESPONSES TO PRECIPITATION VARIABILITY IN MEDITERRANEAN INSULAR AQUIFERS

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### ABSTRACT

Groundwater is one of the largest and most important sources of fresh water on many regions under Mediterranean climate conditions, which are exposed to large precipitation variability that includes frequent meteorological drought episodes, and present high evapotranspiration rates and water demand during the dry season. The dependence on groundwater increases in those areas with predominant permeable lithologies, contributing to aquifer recharge and the abundance of intermittent streams. The increasing pressure of tourism on water resources in many Mediterranean coastal areas, and uncertainty related to future precipitation and water availability, make it urgent to understand the spatio-temporal response of groundwater bodies to precipitation variability, if sustainable use of the resource is to be achieved. We present an assessment of the response of aquifers to precipitation variability based on correlations between the Standardized Precipitation Index (SPI) at various time scales and the Standardized Groundwater Index (SGI) across a Mediterranean island. We detected three main responses of aquifers to accumulated precipitation anomalies: (i) at short time scales of the SPI (< 6 months); (ii) at medium time scales (6–24 months); and at long time scales (> 24 months). The differing responses were mainly explained by differences in lithology and the percentage of highly permeable rock strata in the aquifer recharge areas. We also identified differences in the months and seasons when aquifer storages are more dependent on precipitation; these were related to climate seasonality and the degree of aquifer exploitation or underground water extraction. The recharge of

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