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Exploring causes of hydrological alterations in the Medjerda catchment, Algeria

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The Mediterranean area is considered to be a hotspot of climate change. This will have a considerable impact of hydrologic functions and services of Mediterranean catchments. Yet, climate change effects will interfere with other sources of hydrologic alterations such as land use change, adaptation of water management and policy, and others.
In this study, we explore the causes of hydrological alteration of the Tunisian-Algerian transboundary basin of Medjerda. This basin covers 23,600 km2 of which 7500 km2 are in Algeria, or 30% of the total area. We propose to study hydrological alteration regimes based on a standard hydrometeorologic database (streamflow, precipitation) collected in Algeria. The data base is enriched with generic time series on evaporation temperature and NDVI, inferred from the Google Earth Engine cloud-based platform. We construct the time series on a daily time step and for a period of 15 years. We subsequently apply advanced non linear time series analysis tools (Convergent Cross Mapping / Dynamic Factor Analysis) on the hydrological database to detect causal relationships and to quantify the importance of different factors contributing to the hydrologic alterations in this catchment.