

Hydroclimate temporal variability in a coastal Mediterranean watershed: the Tafna basin, North-West Algeria

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Abstract

One of the major challenges scientists, practitioners and stakeholders are nowadays involved in, is to provide the worldwide population with reliable water supplies, protecting, at the same time, the freshwater ecosystems quality and quantity. Climate and land use changes undermine the balance between water demand and water availability, causing alteration of rivers flow regime. Knowledge of hydro-climate variables temporal and spatial variability is clearly helpful to plan drought and flood hazard mitigation strategies but also to adapt them to future environmental scenarios. The present study relates to the coastal semi-arid Tafna catchment, located in the North-West of Algeria, within the Mediterranean basin. The aim is the investigation of streamflow and rainfall indices temporal variability in six sub-basins of the large catchment Tafna, attempting to relate streamflow and rainfall changes.

Rainfall and streamflow time series have been preliminary tested for data quality and homogeneity, through the coupled application of two-tailed t test, Pettitt test and Cumsum tests (significance level of 0.1, 0.05 and 0.01). Subsequently maximum annual daily rainfall and streamflow and average daily annual rainfall and streamflow time series have been derived and tested for temporal variability, through the application of the Mann Kendall and Sen's test. Overall maximum annual daily streamflow time series exhibit a negative trend which is however significant for only 30% of the station. Maximum annual daily rainfall also exhibit a negative trend which is intended significant for the 80% of the stations. In the case of average daily annual streamflow and rainfall, the tendency for decrease in time is unclear and, in both cases, appear significant for 60% of stations.