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Hydro-climatic variability in two Moroccan basins: comparative analysis of temperature, rainfall and runoff regimes

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Abstract The increase of temperature over Morocco, projected by climate models, should affect hydro-climatic regimes and ecological and socio-economic systems. In order to investigate the evolution of these regimes in the large basins of Tensift and Bouregreg, we compared the trends of observed temperature, rainfall and runoff variability. Annual temperature time series show significant increasing trends ranging between 0.07 and 0.25°C per decade in both basins. Shifts in annual and monthly temperature trends were recorded between the mid-1970s and mid-1980s and also in the early-1990s. In both basins, total annual rainfall decreased and changed its regime in the late-1970s, monthly rainfall regime changed only in the Tensift basin between early and mid-1970s. Runoff in both basins showed no significant trend for most of the stations, but a consistent decreasing trend since the early-1970s in the Tensift basin and the late-1970s and the early-1980s in the Bouregreg basin. Significant hydro-climatic changes occurred first in the southern basin (Tensift). Ruptures are most frequent in the spring and summer monthly time series.

Key words temperature; rainfall; runoff; hydro-climatic regime; variability; trend; rupture; Tensift; Bouregreg; Morocco