



Streamflow response to climate variability in sub-watersheds of the Sebou river basin, Morocco

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Abstract

Morocco, like many other Mediterranean countries is facing water resources scarcity due to its arid to semi-arid conditions, affected by the recent climatic changes, mainly recurrent drought events observed during the last five decades. Stream flows, the main feeding source of the major reservoirs used for irrigation, drinking water, and hydro-power, are particularly affected by these changes. In this paper, long term trends of stream flow in relation to climatic data were studied in four sub-watersheds of the Sebou river basin in northern Morocco. A hydrologic simulation was performed on one of the sub-watershed using two hydrologic models, IHACRES and HEC-HMS. Over the past five decades, stream flow and precipitation data showed a cyclic trend as well as a general decline with variable amplitude from one sub-basin to another. Recorded stream flows were significantly correlated with the corresponding precipitation values. An average rainfall decline over the past 50 years varied from -285 mm to -150 mm, corresponding to about 25% decrease. Stream flow modeling with both models gave very reasonable simulations that were comparable over the series studied. Differences among years with contrasting climatic conditions were well illustrate and showed large disparities in terms of total annual discharges, ranging from 0.93 billion m³/yr to 5.3 billion m³/yr for dry and wet year conditions respectively. The models used can be used as tools for predictions of stream flow in response to climatic variability for sound water resources management.

Key words: climate change, stream flow, modeling, IHACRES, HEC-HMS, Morocco.