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Climate change and precipitation evolution in Ifran region (Middle Atlas of Morocco).

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Climate variability and extreme climatic events pose significant risks to human beings and generate terrestrial ecosystem dysfunctions. These effects are usually amplified by an inappropriate use of the existing natural resources. To face the new context of climate change, a rational and efficient use of these resources - particularly, water resource - on a global and regional scale must be implemented. Annual precipitation provides an overall amount of water, the assessment and management of this water is complicated due to the spatio-temporal variation of disturbance (aridity, rainfall intensity, length of dry season...). Therefore, understanding rainfall behavior would at least help to plan interventions to manage this resource and protect ecosystems that depend on it.
Time-series analysis has become one of the major tools in hydrology. It is used for building mathematical models to detect trends and shifts in hydrologic records and to forecast hydrologic events. In this paper we present a case study of IFRAN region, which is situated in the Middle Atlas Mountains in Morocco. This study deals with modeling and forecasting rainfall time series using monthly rainfall data for the period 1970-2005. To determine the seasonal properties of this series we used first the Box-Jenkins methodology to build ARIMA model, and we expended the analysis with the Hylleberg-Engle-Granger-Yoo (HEGY) tests. The results of time series modeling showed the presence of significant deterministic seasonal pattern and no seasonal unit roots. This means that the series is stationary in all frequencies. The model can be used to predict rainfall in IFRAN and near sites; this prediction is not without interest in so far as any information about these random variables could provide a contribution to the researches made in domain for fighting against climate change. It doesn't give solutions to eradicate the precipitation variability phenomenon, but just to adapt to it.