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## Precipitation trends and ruptures effect on catchment hydrology and water resources availability for agricultural lands under climate change

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Water resources depletion under climate change is a major concern over the world. Mediterranean countries are deeply affected by changes in precipitation intensity, duration and frequency. Such changes lead to decrease in the averaged stream discharge and groundwater recharge consequently decreasing water resources availability. Our research focused on a case study performed in the Loukkos catchment, draining an area of 3730 km<sup>2</sup>, located in the north of Morocco. Trend analysis of 8 to 62 years of precipitations was conducted based on statistical tests at about ten stations over the catchment. 20 to 70 years of temperature and discharge data were also analyzed. The time series were investigated using several non-parametric tests in order to characterize trends, to track down changes and their effect on agricultural land changes at the catchment scale. The present study highlights the impact of climate and catchment hydrology on agricultural practices and water resources used for irrigation. Analysis of precipitation indices showed that the temporal distribution of precipitation in the study area has changed since the 1970s. This change results from a reduction in precipitation, a shift in the hydrological year and a reduction in the number of wet days per year. Severe drought periods appear after the climatic rupture, which occurred around 1971. An increase in the intensity and frequency of droughts, in addition to an increase in the annual and seasonal average temperature (more than 1°C) were observed. Such changes contributed to agricultural practice modifications, with development of irrigated agriculture and later sowing period to adapt to the delay in the onset of the rains. For the future, the use of IPCC/CMIP5 climate projections for the Mediterranean region will help to evaluate how the precipitation indices will evolve. The impact of irrigation on stream discharge and groundwater recharge needs to be considered through agro-hydrological modeling including agricultural trajectory. Such tools will help to strengthen agricultural adaptation strategies and promote resilient farming practices.

**Keywords:** Precipitation trends, agricultural land use, water use for irrigation, agricultural adaptation strategies.

