Geophysical Research Abstracts
Vol. 20, EGU2018-11092, 2018
EGU General Assembly 2018

Impacts of climate change in southern Portugal: water conservation problems for irrigated agriculture

Inês Morais (1), João Pedro Nunes (1,2), Luís Dias (1), and Amandine Pastor (3)

(1) CE3C: Centre for Ecology, Evolution and Environmental Changes, Faculty of Sciences, University of Lisbon, Portugal, (2) jpcnunes@fc.ul.pt, (3) IRD - INRA, UMR LISAH, Montpellier, France

Mediterranean regions are highly vulnerable to climate change, which is expected to lead to lower precipitation and higher temperatures, with consequences for evaporation demands and on the available water to meet them through irrigation. Adapting to climate changes therefore requires changes to how water resources are used, and on the type of crops selected for irrigation, in order to conserve water and maintain a sustainable agriculture.

This work presents a study for the Algarve region in southern Portugal. The main objective is to understand how water resources' supply and demand (will have to) change in a drier future. Therefore, the work focuses on the region's most important reservoirs and the corresponding irrigation networks, comprising 3 distinct irrigation systems; and on one reservoir used for domestic supply in the region. Irrigated cultures are dominated by citrus orchards, corn, green vegetables and rice.

Monthly water balance was calculated using the Thornthwaite Mather sequential approach, which takes into account precipitation, potential evapotranspiration, soil water retention and runoff generation properties, and vegetation water use properties. The model was calibrated for one of the reservoir and its corresponding irrigation network, and validated for a second reservoir-irrigation system using a Split Sample approach. Preliminary results indicate satisfactory results for calibration (r2 = 0.61, Bias = 0.6%) and good results for validation (r2 = 0.76, Bias= 0,5%).

After the model application to present climatic conditions (1970-2005 climatic normal), future scenarios will be simulated in three different periods: 2011-2040, 2041-2070, and 2071-2100. Emission scenarios RCP 4.5 (mid-level) and 8.5 (severe) will be taken into account, as simulated by nine regional climate models using EUROCORDEX results, which will take into account both scenario and model uncertainty. The results will be used to assess changes to water stress using the Water Exploitation Index, i.e. the rate of water demand over water supply, and to identify the most pressing adaptation needs for water conservation.