



Evaluation of the impact of climate change on the water resources, crop needs and water quality of the Jalón river (Spain)

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Climate models predict an increase in temperature, T , and a decrease of precipitation, P , for the Mediterranean regions. These trends will decrease the available water resources, increase the water demand of crops and affect the water quality. The Ebre river basin is one of the largest basins in Spain. Preliminary evaluations of the potential impact of the climate change on its water resources pointed out that the sub-basins located in the Southeastern part of the basin are the most vulnerable. The Jalón river sub-basin is one of such sub-basins. It has a drainage area of 10187 km² and shows a wide range of climatic, geologic, and land use conditions.

The impact of climate change on the water resources of the Jalón River sub-basin has been evaluated for the period 2071-2100 for the A2 and B2 emission scenarios by using a semi-distributed water balance model. The results indicate that the mean annual temperature will rise from 2 to 4 °C while the mean annual precipitation will decrease from 14% to 18%. Groundwater recharge will decrease dramatically (from 60% to 80%) while the total stream flow will decrease from 59% to 77%. The increase in crop water demand will range from 12% to 16% while the net crop water demand will increase from 25% to 33%. The concentration of a conservative chemical species such as Cl⁻ in the runoff will increase by a factor ranging from 1.45 to 5. These predictions, which may contain uncertainties, have been taken into account in the program of measures of the Ebre river basin water plan. The main sources of uncertainty come from the historic hydrological data, the global and regional circulation models, the definition of the scenarios, the downscaling method and the hydrological model.

Acknowledgements. The research leading to these results has received funding from the Ebre River Authority (Proyect 2010-PH-02.I) and a project from the Ministry of Economy and Competitiveness (Project CGL2012-36560). The work of Bruno Pisani was funded by the Galician Regional Government (Fund 2012/181 from “Consolidación e estruturación de unidades de investigación competitivas”, Grupos de referencia competitiva).