

Assessing the capacity of water resources to meet current and future water demands over the Ebro catchment (Spain)

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Abstract Since the late 1970s, a negative trend in river discharge has been observed at the outlet of the Ebro catchment (Spain). This can be attributed to a decrease in mean precipitation, a rise in mean temperature, and a water consumption increase. Moreover, over 230 storage-dams were built to regulate river discharge in the basin. An integrated water resource modelling framework was developed to assess whether future water demands could be satisfied under both climatic and anthropogenic changes. This approach confronts water supplies, generated by a conceptual hydrological model and by a storage-dam module, and water demands and environmental flow requirements. Water demands are evaluated for the most water-demanding sectors, i.e. the agricultural and domestic sectors. The capacity of water resources to meet demands is assessed through a water allocation index. Results show growing competition among users, especially during the summer season. They also highlight the interest of integrated modelling with regard to providing complete analysis of water resources' capacity to meet water demands under complex evolution scenarios in order to support decision-making.

Key words Ebro catchment; water supply; water demands; water allocation; storage-dam modelling; integrated modelling