

Water supply capacity of a meso-scale Mediterranean catchment under climatic and anthropogenic changes

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Abstract Assessing water supply capacity is crucial, notably in the Mediterranean region, identified as a hot-spot of climate change and where water demands have been continuously increasing. The Hérault River catchment (France) is representative of this context since its discharge has undergone a significant decrease over recent decades. A modelling framework is proposed to assess the ability of the water supply to satisfy water demands over the last 50 years. The water supply was evaluated using a hydrological model and a dam management model. Dynamics of water demands were estimated for the domestic and agricultural sectors. A water supply capacity index was then computed to assess to what extent water demands have been satisfied at the sub-basin scale. Runoff dynamics are fairly well represented in both calibration and validation with the hydrological and the dam management models (Nash-Sutcliffe criteria above 0.8). Domestic demands have increased since the 1980s and are characterized by a seasonal peak in summer. Agricultural demands have been increasing in the driest portions of the watershed and decreasing in the wettest portions where the irrigated area has decreased. Although most water demands were highly satisfied from 1961 to 1980, water demands in downstream portions were frequently not satisfied in summer after the 1980s.

Key words climate change; integrated modelling; water resources; water demand; water supply assessment; River Hérault