



1 Climate change scenario and water/nutrient balance response of two river basins in the Mediterranean

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The potential effects of climate change scenarios on hydrological response and water quality dynamics have been investigated for two river basins with different hydrological characteristics: Rio Mulargia (Sardinia Island) and Enza river (Emilia Romagna). The first one is a typical mediterranean temporary catchment, with periods with no flow and extreme first flush effects, featuring a rather light human pressure, while the second one is a perennial river in the middle-northern Italy whose catchment supports a rather intense agriculture and breeding and high rates of manure application.

This study is aimed at studying and comparing the response of the two catchments (that are representative for two clearly different environmental and human landscapes) to the expected global change with reference to the water, sediment and nutrients balance. An increased knowledge on this issue can help land managers in developing sound strategies in the view of the drafting of the River Basins Management Plans required by the EU Water Framework Directive.

Discharge and nutrients for the present climate condition have been successfully simulated for both the rivers, using the water management basin model “Soil and Water Assessment Tool” (SWAT).

The input data for climate simulations have been derived by four Global Climatic Models developed by different modelling centres: the UK Hadley Centre for Climate Prediction and Research (HadCM2), the German Climate Research Centre (ECHAM4), the Canadian Centre for Climate Modelling and Analysis (CGCM1)

and the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO-Mk2).

Five scenarios were simulated using the monthly data of temperature and precipitation (CSIRO 2050, ECHAM 2050, HADCM 2020/2050/2080) distributed by the IPCC-DDT (Data Distribution Centre of the Intergovernmental Panel on Climate Changes).

The results from the modeling of future climate scenarios were finally used to compare the effects of these changes on water and nutrient balance of the two river basins and discussed in the paper.