

ASSESSING THE IMPACT OF CLIMATE CHANGE ON THE WATER BALANCE AND SURFACE FLOWS IN THE MEDITERRANEAN BASINS OF FRANCE.

Pere Quintana Seguí^{1,2}
Aurélien Ribes¹
Eric Martin¹
Florence Habets¹

1 CNRM-GAME - Météo France - CNRS –Toulouse (France)

2 Observatori de l'Ebre – Universitat Ramon Llull - CSIC – Roquetes (Spain)
pquintana@obsebre.es

The Mediterranean region of France is particularly vulnerable to the impact of climate change. The French project CYPRIM, has studied the impact of climate change on the hydrological cycle using an improved version of the distributed hydrometeorological model SIM. This model can simulate the surface hydrological processes at a resolution of 8km and the flows associated with more than 800 stations. The study has taken a methodological approach, focusing on the uncertainties due to the downscaling of the regional climate model and the impact model.

We use the regional climate model SAMM, which is the product of the coupling of a global atmospheric model with variable resolution (50 km resolution on the Mediterranean) and a regional model of ocean circulation (10 km). With this model, a simulation of 138 years (since 1960) has been carried out using the emissions scenario SRES-A2. The resulting climate scenario was subsequently downscaled to the resolution of the impact model using two methods. The first one, unbiases the distribution of the model outputs correcting each percentile. The second method is based on weather types.

The study has shown that the choice of the method of downscaling is crucial, especially for small basins where threshold effects are important. In general, if we look at the changes in relative terms, the study shows that the two methods draw similar futures. During the twenty-first century mean discharge will decrease in the Mediterranean basin, but the extremes (99 percentile) can increase in some watersheds. But the methods differ on some important points, such as the location of the changes in the flows or the variability of evaporation during the autumn. The study also shows that the results obtained with both methods diverge over time.