



Validation of IPCC AR4 models over the Iberian Peninsula

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ABSTRACT

Global Climate Models (GCMs) are sophisticated numerical tools designed to simulate the Earth's Climate that need supercomputing devices to run on. Only a few research institutions worldwide have developed such models and run integrations of these GCMs in order to support the activities of the Intergovernmental Panel on Climate Change (IPCC). However, numerical models are not perfect. Consequently, and before using the IPCC model results in order to establish future climate scenarios, these numerical models need previous assessments of their accuracy. In particular, evaluations of these models are a necessary first step that has to be carried out when climate models are thought to be used in downscaling projects. In this sense several scientific papers have recently dealt with this question. In all these papers, authors investigate the performance of different IPCC climate models by measuring their ability to describe today's climate at different scales from global to regional.

This work analyses the ability of twenty four coupled global climate models that were used in the Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change's (IPCC) to simulate the observed monthly seasonal cycle of sea level pressure, surface air temperature and precipitation over the Iberian Peninsula in the last decades of the twentieth century. The period investigated covers from 1979 to 1998. In order to assess the performance of the models, averaged seasonal cycles and probability density functions (PDFs) deduced from model simulations are compared with the corresponding seasonal cycles and PDFs deduced from the data contained in the ERA40 reanalysis project and in the Global Precipitation Climatology Project (GPCP). A ranking of AR4 model performance is finally obtained. MIROC3.2-HIRES, MPI-ECHAM5, GFDL-CM2.1 and BCCR-BCM2.0 and UKMO-HADGEM1, get outstanding scores for 1979-1998 period over the Iberian Peninsula.