



Comparison and validation of gridded precipitation datasets for Spain

Pere Quintana-Seguí (1), Marco Turco (2), and Gonzalo Míguez-Macho (3)

(1) Observatori de l'Ebre (Universitat Ramon Llull - CSIC), Roquetes, Spain (pquintana@obsebre.es), (2) Barcelona Supercomputing Center-Centro Nacional de Supercomputación (BSC-CNS), Barcelona, Spain (turco.k2@gmail.com), (3) Facultade de Física, Universidade de Santiago de Compostela, Santiago de Compostela, Spain (gonzalo.miguez@usc.es)

In this study, two gridded precipitation datasets are compared and validated in Spain: the recently developed SAFRAN dataset and the Spain02 dataset. These are validated using rain gauges and they are also compared to the low resolution ERA-Interim reanalysis.

The SAFRAN precipitation dataset has been recently produced, using the SAFRAN meteorological analysis, which is extensively used in France (Durand et al. 1993, 1999; Quintana-Seguí et al. 2008; Vidal et al., 2010) and which has recently been applied to Spain (Quintana-Seguí et al., 2015). SAFRAN uses an optimal interpolation (OI) algorithm and uses all available rain gauges from the Spanish State Meteorological Agency (Agencia Estatal de Meteorología, AEMET). The product has a spatial resolution of 5 km and it spans from September 1979 to August 2014. This dataset has been produced mainly to be used in large scale hydrological applications.

Spain02 (Herrera et al. 2012, 2015) is another high quality precipitation dataset for Spain based on a dense network of quality-controlled stations and it has different versions at different resolutions. In this study we used the version with a resolution of 0.11° . The product spans from 1971 to 2010. Spain02 is well tested and widely used, mainly, but not exclusively, for RCM model validation and statistical downscaling.

ERA-Interim is a well known global reanalysis with a spatial resolution of ~ 79 km. It has been included in the comparison because it is a widely used product for continental and global scale studies and also in smaller scale studies in data poor countries. Thus, its comparison with higher resolution products of a data rich country, such as Spain, allows us to quantify the errors made when using such datasets for national scale studies, in line with some of the objectives of the EU-FP7 earthH₂Observe project.

The comparison shows that SAFRAN and Spain02 perform similarly, even though their underlying principles are different. Both products are largely better than ERA-Interim, which has a much coarser representation of the relief, which is crucial for precipitation.

These results are a contribution to the Spanish Case Study of the earthH₂Observe project, which is focused on the simulation of drought processes in Spain using Land-Surface Models (LSM). This study will also be helpful in the Spanish MARCO project, which aims at improving the ability of RCMs to simulate hydrometeorological extremes.