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Assessing the Use of Satellite-Based Estimates and High-Resolution Precipitation Datasets for the Study of Extreme Precipitation Events over the Iberian Peninsula

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The socio-economic impacts associated to Extreme Pecipitation Events (EPEs) affecting the Iberian Peninsula (IP), have recently become of great interest for both decision makers and insurance companies, in the light of the expected regional signature of the ongoing climate change. Although EPEs are quite common over the IP, it is not ascertained yet which product, either reanalysis or satellite estimates, is the most appropriate for studying extreme precipitation days. However, accurate estimates of rainfall are essential for the risk assessment of any water-related natural hazards.

The present work (Hénin et al., 2018) is intended as a follow-up to Liberato et al. (2017) where a preliminary assessment of four EPEs that occurred over IP has been carried out using both ERA-Interim reanalysis from the European Centre for Medium-Range Weather Forecast (ECMWF) and TRMM data. It aims at assessing which high-resolution precipitation datasets (including the recently released ERA5 data) provides for the most reliable estimates during heavy rain episodes over the IP, thus being bene[U+FB01]cial for any future investigation of EPEs over the region.

Therefore, daily accumulated precipitation on the IP for the 2000–2008 extended winters from ERA-Interim and ERA5 reanalysis (ECMWF) and from two TRMM Multisatellite Precipitation Analysis (TMPA) products are considered for comparison with the best ground-based high-resolution ($0.2^\circ \times 0.2^\circ$) gridded precipitation dataset available for the region (IB02). Accuracy metrics are analysed for different quartiles of daily precipitation amounts, and additional insights are provided for a subset of EPEs extracted from an objective ranking of extreme precipitation days over the IP (Ramos et al., 2014). Results show that both reanalysis and multi-satellite datasets overestimate (underestimate) daily precipitation sums for the least (most) extreme events. In addition, it is shown that the TRMM TMPA precipitation estimates from the near-real-time product may be considered for EPEs assessment over these latitudes. Finally, it is found that the new ERA5 reanalysis accounts for large improvements over ERA-Interim and it also outperforms the satellite-based datasets.

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