Extreme Hot Days future projections using Circulation Types

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This work presents an ensemble of future climate change projections of Extreme Hot Days (EHDs) for Spain. EHD are defined as the days with temperature over the 95 percentile of extended 8 summer regional series (Garcia-Valero et al, 2015). The ensemble consist of 18 members. These come from varying the RPC (4.5 and 8.5), the global model (MPIM,EC-EARTH, CCSM) and the Circulation Type (CT) classification (Z500-SLP, Z500-T850, SLP-T850) obtained in Garcia-Valero et al (2015).

Firstly, the ability of GCMs for representing the observed extreme CTs in the historical runs is assessed. All models represent satisfactory most CTs for all classifications, being the bias errors of the frequency appearance of the CTs always under the 15%. Results indicate that the CTs having the largest efficiencies in EHD production has the biggest increase along the next century. This leads to that all regions strongly increase the frequency appearance of EHD. The EHD increase is larger in the inner regions towards the north of Spain, reaching an increase of 3 times the current frequency at the end of this century . This shift is mainly attributable to changes in the atmospheric dynamics. It is very likely that the this value is a low boundary of EHD positive change, since most regional processes (feedbacks, persistence, etc) tends to increase high temperature events. In addition, an analysis of uncertainties has been carried out. An ANOVA analysis shows that the uncertainty associated to each source (GCMs, CT-class, RPC) depends on the region. However the general behavior is that the largest uncertainty is assigned to the GCM, while RCP and CT-class presents similar uncertainty.