



Multi-model ensemble projections for temperature and precipitation in Portugal

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This study is focused on analysing climate change projections for seasonal (3-month) temperatures and precipitation totals and their corresponding extremes over mainland Portugal. Due to the strong seasonality of the precipitation regimes in Portugal, winter (DJF) and summer (JJA) are analyzed separately, whilst for the temperatures all the seasons are considered. A 13-member ensemble of regional climate model simulations for both temperature and precipitation (A1B scenarios) are used. Bias corrections for the near future period (2041–2070) are performed using a recent past period (1961–2000) observational gridded dataset (E-OBS) and equally-weighted ensemble statistics are computed. Temperature and precipitation-based indices of extremes are then computed and discussed. Significant projected changes in precipitation are depicted, with a clear distinction between northwestern Portugal and the rest of the country in both seasons. Overall, precipitation is projected to decrease in both winter and summer, mainly over northwestern Portugal in winter, though some major regional differences are also detected. Although precipitation is projected to decrease in most cases, extremely high seasonal precipitations (above the 95th percentile) are projected to increase in winter. Regarding temperatures, results show a clear shift towards higher future seasonal means. These findings in central tendencies, and also in both tails of their distributions, are particularly relevant for summer and autumn maximum temperatures (2–4°C). Wintertime temperature changes are weaker than in other seasons. Additionally, frequencies of occurrence of daily extremes are projected to increase, particularly in summer maximum temperatures over inland Portugal. This work is supported by European Union Funds (FEDER/COMPETE – Operational Competitiveness Programme) and by national funds (FCT – Portuguese Foundation for Science and technology) under the project FCOMP-01-0124-FEDER-022692.