

High-Resolution Surface Temperature Changes for Portugal Under CMIP6 Future Climate Scenarios

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Abstract : Future changes in the mean, maximum and minimum temperature in continental Portugal were investigated using high-resolution future climate projections based on the latest IPCC AR6 CMIP6 climate scenarios. The results show that the mean, maximum and minimum temperatures are projected to increase substantially in all of continental Portugal, particularly in the south-central inland regions. For the near-term future (2046-2065 period), SSP3-7.0 is the future climate scenario that projects higher increases of around 1 °C, 1.5 °C and 2 °C for the daily mean, maximum and minimum temperatures, respectively. For the long-term future (2081-2100 period), the projected warming is higher, particularly under the SSP5-8.5 future climate scenario with projected warmings of 3 °C, 3.5 °C and 2.5 °C for the daily mean, maximum and minimum temperatures, respectively. Occurrences of hot days (mean temperature above 30 °C), very hot days (maximum temperature above 40 °C) and tropical nights (minimum temperature above 20 °C) are all projected to increase up to 35-40, 12-15 and 50 more days per year, respectively, mainly in the interior areas of Portugal. Oppositely, the occurrence of frost days is projected to decrease in practically all mountainous areas in Portugal. These results show a clear tendency of a significant increase in the surface temperatures and frequency of occurrence of extreme temperature episodes in continental Portugal, which can have severe impacts on the population, environment, economy and vital human activities such as agriculture.

Keywords : climate change, global warming, CMIP6, Portugal

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