



Is climate change effect on probability of rainfall over the Mediterranean region depending on model resolution?

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This study describes the impact of climate change on rainfall probability over three Mediterranean areas: (1) North-Western coast, (2) South Italy and (3) central part of the Mediterranean sea. The effect of adopting model version with different horizontal resolutions is analyzed. Two climate representative concentration pathways (rcp4.5 and rcp8.5) three different grid resolutions (0.11, 0.44 e 0.75 degs) are considered. The first two simulations (0.11. and 0.44degs resolution) have been carried out using COSMOMED, which is a coupled atmosphere-ocean system consisting of the regional climate model COSMO-CLM and the ocean-sea model NEMO. The low resolution (0.75 degs) simulation has been carried out with a global AOGCM model, named CMCC-CM, whose results have been used to force the regional model simulations. High resolution simulations are still in progress (presently the year 2090 has been reached). Therefore, this abstract is limited to comparing the time slice 2021-2050 (warm period) to the reference period 1961-1990. Simulations are expected to complete the whole 21st century in about one month and results will be available at the EGU 2019 conference. In general, simulations confirm the widespread decrease of total precipitation over the Mediterranean region with global warming.

This preliminary analysis considers, specifically the probability of wet days (daily cumulated rain > 1mm) and of heavy rainfall (daily cumulated rain > 80 mm) . Future (2021-2050) conditions show a clear decrease of wet days probability, in the three considered areas, ranging from -2% to -5%. This change is larger as the spatial resolution increase. Heavy rainfall probability is low (slightly below 0.2% in general), and larger at high resolution over land. With global warming it exhibits a moderate growth, whose value has anyway no clear relation with the model resolution.

At the conference results considering the whole 21st century (and likely describing a larger climate change signal) will be available and the analysis will be extended to other areas.

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