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# Scaling properties of sea surface temperature for various global warming levels in CMIP6 models

**Josipa Milovac**[1], Maialen Iturbide[1], Joaquin Bedia[2], Jesus Fernandez[1], and Jose Manuel Gutierrez[1]
[1]Meteorology Group, Instituto de Física de Cantabria, CSIC-Universidad de Cantabria, 39005 Santander, Spain
[2]Meteorology Group, Dept. Applied Mathematics and Computer Sciences, Universidad de Cantabria, Santander, 39005, Spain

Mean sea surface temperature (SST) increased during the 20th century and continues to rise on average at a rate of 0.14 ºC per decade. In the last decade, mean SST showed an increase of 0.88 ºC compared to the pre-industrial era and, according to the latest IPCC report (Masson-Delmotte et al., 2021), 83% of the ocean surface will very likely continue to warm up until the end of this century in all Shared Socioeconomic Pathways (SSP). Global mean surface air temperature (GSAT) has increased by 1.09 ºC since the pre-industrial times, and it is projected to continue to rise by 1.0 - 5.7 ºC (depending on the SSP scenario) until the end of the 21st century. GSAT incorporates land surface air temperature (LSAT) and sea surface air temperature (SSAT) in the models.

In this study we analyze the CMIP6 ensemble of global climate models to identify projected scaling properties between SST, SSAT, and GSAT under various SSP scenarios. Preliminary analysis indicates that the temperatures are linearly correlated, with the scaling factor of ~0.8 for SSAT and GSAT, ~0.7 for SST and GSAT, and ~0.87 for SST and SSAT at the global warming level of 2 ºC. Such scaling is regionally dependent, and does not apply to the polar oceanic regions. Furthermore, we explore the dependence of the scaling properties on the global warming levels, and how sensitive the results are for the coastal regions.

**References:**

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