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Multidecadal Marine Heat Wave Variability in the Mediterranean

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Marine heatwaves (MHW) have emerged as critical factors driving shifts and negative impacts on marine ecosystems and to ecosystem services. MHW frequency and severity is expected to increase in response to climate change and there is a need to assess the effect of past MHW on marine ecosystems in order to better understand future trends and impacts.

The aim of this work is provide a long term downscaled analysis of the Mediterranean MHW and cold spells (MCS) at 0.05° spatial resolution, and to further focus this analysis to four specific domains (Northern Adriatic, Ligurian Sea, Gulf of Lion, Catalan Sea) and 43 coastal locations in the Mediterranean basin. This analysis can be used to explore the links with other environmental and ecological data.

Multidecadal L4-gridded satellite SST measurements are used to analyze statistical properties of MHW and MCS in the Mediterranean basin from 1989 until present. Methodology from Hobday et al. (2016, 2018) is used for the analysis. For each of the locations, cumulative MHW and MCS intensities are aggregated by year. All locations indicate a steep rise of MHW cumulative intensity and a sharp decline of MCS. Generalized extreme value analysis is performed to estimate multidecadal variability of SST anomaly return periods. Results show that at all locations a given return period gets associated with more and more extreme SST anomalies as time progresses.