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Wind-Speed Anomalies and SST Rise: Investigating the Mid-2023 Heatwave Propagation below the sea surface

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For the study of the marine heatwave that occurred from mid-May to late summer 2023, data provided by AEMET (Spanish Meteorological Agency) for the Gran Canaria Airport and Sea Surface Temperature from Copernicus (products METOFFICE-GLO-SST-L4-REP-OBS-SST and METOFFICE-GLO-SST-L4-NRT-OBS-SST-V2) have been utilized. The employed data include the daily records of meteorological and oceanographic variables from 1982 to 2023.

A climatological normal year has been computed based on wind speed and Sea Surface Temperature (SST) data, calculating the mean value and smoothing the result with a moving average. A drop in wind speed has been observed in periods when the usual Trade winds are active over the eastern margin of the Atlantic ocean, decreasing from 13.8 m/s in early May, to only 3.0m/s in June, falling 5.8 m/s below the calculated average for that time of year. Associated with this decrease in wind intensity, there is a delayed increase in SST, reaching an average of 2.3 ºC above normal throughout the summer. Even after a subsequent increase in wind intensity, SST does not drop below normal values for the rest of the year. This relationship between a decrease in the wind intensity and an increase in the SST would suggest that the heat is being accumulated in the sea surface. We hypothesize that winds did not facilitate heat transfer from the sea surface in the form of sensible heat during a period when sensible heat is usually released from the ocean to the atmosphere.

Under this scenario, with a lack of strong winds, mixing in the first layers of the water column is not effective, and the surface temperature measured from satellites is capturing a phenomenon that might mislead the deep-reaching extent of the anomaly. In ongoing analyses, we explore the impact on the water column affected by this abnormal increase in the sea surface temperature by using data provided by Argo floats profiling in the vicinity of the Canary Islands.