Drivers of recurrent marine heatwaves: the case of the Euro-Mediterranean region

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Periods of prolonged warm ocean water temperatures can directly and indirectly pose a threat to ecosystems and human health. Marine heatwaves (MHWs) have been studied in detail in the last decade, since they impacted crucial marine ecosystems, such as coral reefs. Given their impacts it is key to understand their characteristics and improve their prediction, but this is challenging as they arise from interaction with the atmosphere. In recent years MHW events have become more frequent at the global scale, due to trends in sea surface temperatures and concurring anomalous atmospheric conditions.

In this work we discuss the drivers and effects of MHWs in the Euro-Mediterranean region, which experience prolonged warm anomalies between 2022 and 2023. This event attracted large attention as it was one of the most severe and longest on record. Here we combine model data with satellite-based observations to better understand the major contributors to these MHW conditions over the last years, that we find to depend on anomalies in atmospheric circulation and the radiation budget. We compare MHW conditions of recent years with other significant events over the last decades.