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deteCtion and threAts of maRinE Heat waves (CAREHeat) ESA project: How to better characterize Marine Heatwaves ?

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The ongoing project “deteCtion and threAts of maRinE Heat waves – CAREHeat”, funded by ESA in the framework of the Ocean Health initiative, aims at improving the current Marine Heatwaves (MHW) detection and characterization methodologies at the sea surface, at analysing MHW vertical propagation through the development of 4D temperature fields by using Machine Learning approaches, at providing a global atlas of MHW at the sea surface, at advancing the understanding of the physical processes involved in MHW development and at assessing the MHW impact on marine Ecosystems and Biogeochemistry.

This presentation will focus on the first phase of the project. The mostly used MHW detection method (Hobday approach) has been revisited by carrying out sensitivity studies on different threshold parameters such as the choice of the percentile threshold and the minimum duration of the events. Specific work has also been done to investigate the impact of sea surface temperature (SST) trends and prominent climate modes, as El Nino Southern Oscillation (ENSO), in order to disentangle the slow-varying SST component and quasi-periodic oscillations from the abrubt changes that are characteristics of these extreme events . Many metrics are provided along with the global atlas to help the characterization of these events. In parallel with this work, a machine learning approach based on observations has been used to reconstruct a 4D temperature field from the surface up to 300-m depth and MHWs have been estimated. Subsurface MHWs can also impact ecosystems and phase shifts with the surface events can be observed. This product helps to analyse this propagation in depth.

The work is focused on three areas of interest: the tropical Pacific, the western Mediterranean, the Madeira Island region. In these regions, the main outcomes of the 2D and 4D analysis will be presented

Please visit the CAREHeat website (www.careheat.org) and follow us on Twitter (@ careheat_) to

stay up to date about the project research and results