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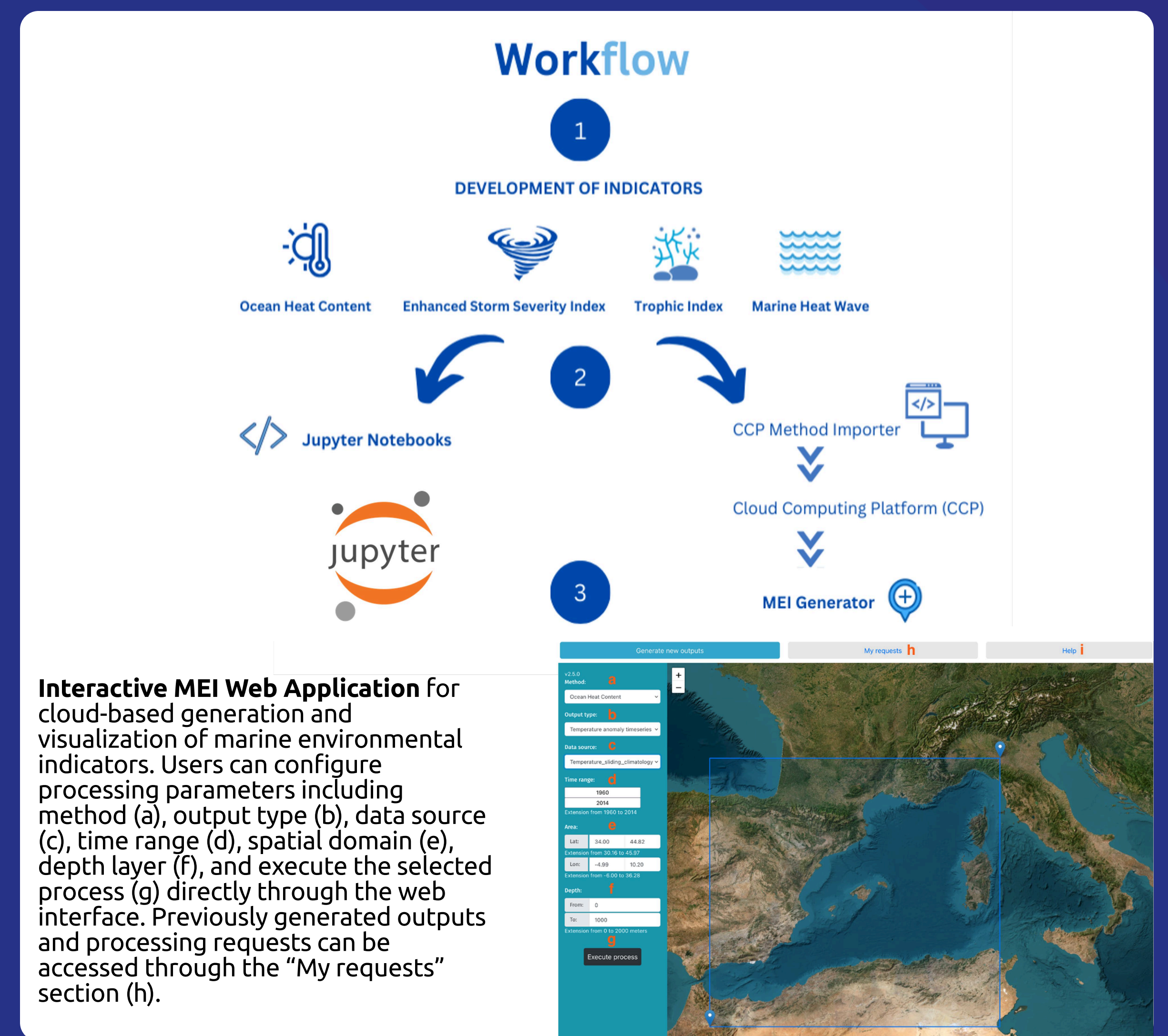
VLAB #4
Learn more about this Vlab

INTRODUCTION

The Marine Environmental Indicators (MEI) VLab supports the monitoring and assessment of marine environmental conditions, providing valuable tools for ocean management and informed decision-making. Designed to be transferable and replicable across different marine regions and user communities, the MEI VLab serves oceanographic and environmental researchers, policy makers and governmental environmental agencies, as well as the blue economy sector, including aquaculture. The platform facilitates access to environmental indicators and analytical tools essential for understanding, assessing, and managing marine ecosystems.

This Vlab represents a unified analytical virtual environment integrating multiple data sources for data processing on the cloud via Jupyter Notebooks and user-friendly web application, available for the following key environmental indicators:

- Marine Heatwaves (MHW)
- Ocean Heat Content (OHC)
- Eutrophication (TRIX)
- Storm Severity Index (SSI)



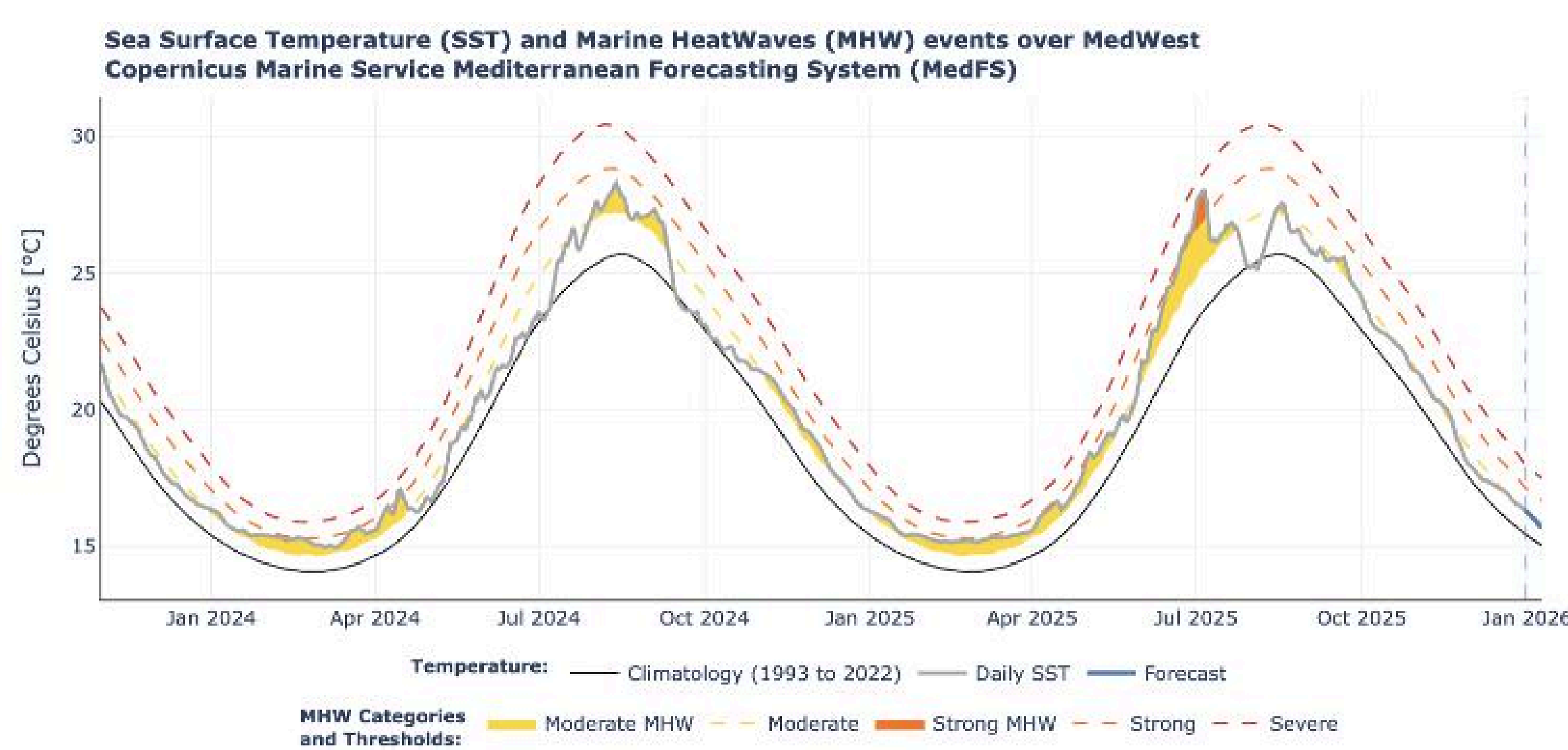
Cloud-based Marine Environmental Indicators for Environmental Assessment

MARINE HEATWAVES (MHW)

The Marine Heatwave analysis available within the VLab is designed for the identification and characterization of persistent anomalously high Sea Surface Temperature (SST) events in the Mediterranean Sea basin and its sub-basins.

The generated outputs include basin-averaged SST time series with event categorizations (moderate, strong, severe, or extreme), as shown in the example below, as well as spatial maps of SST anomalies and MHW categories.

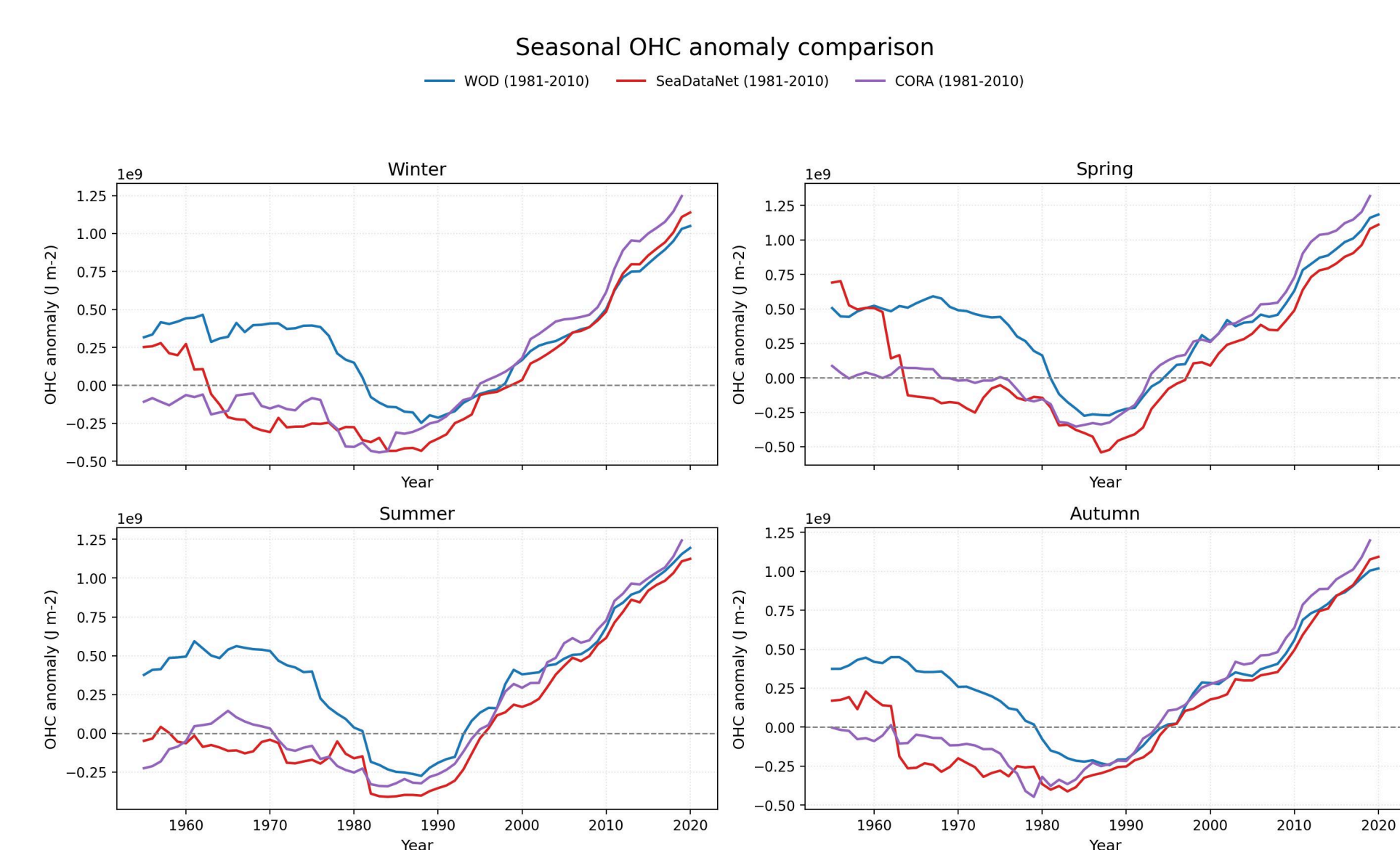
MHW detection based on climatological SST thresholds and anomaly categorization for operational marine heatwave monitoring



OCEAN HEAT CONTENT (OHC)

Ocean Heat Content products provide vertically integrated estimates of heat accumulation in the ocean water column from multi-source temperature datasets and DIVAnd gridded climatologies. Generated outputs include seasonal and annual OHC anomaly analyses derived from WOD, SeaDataNet and CORA datasets for comparison of long-term ocean warming trends and variability.

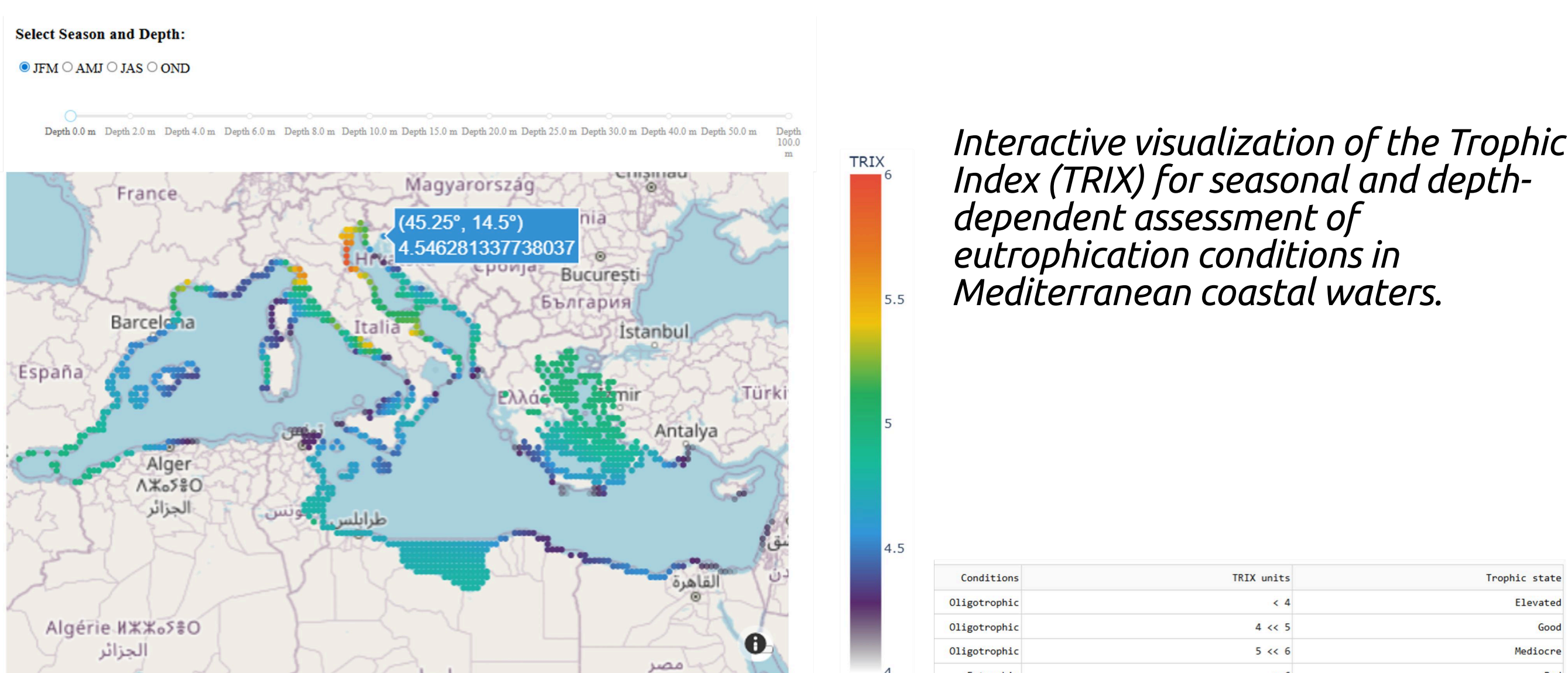
Seasonal Ocean Heat Content (OHC) anomaly comparison derived from WOD, SeaDataNet and CORA datasets, illustrating long-term variability and interannual warming trends across winter, spring, summer and autumn seasons.



EUTROPHICATION (TRIX)

Interactive TRIX indicator supports assessment of coastal eutrophication conditions using harmonized EMODnet Chemistry datasets and DIVAnd climatologies.

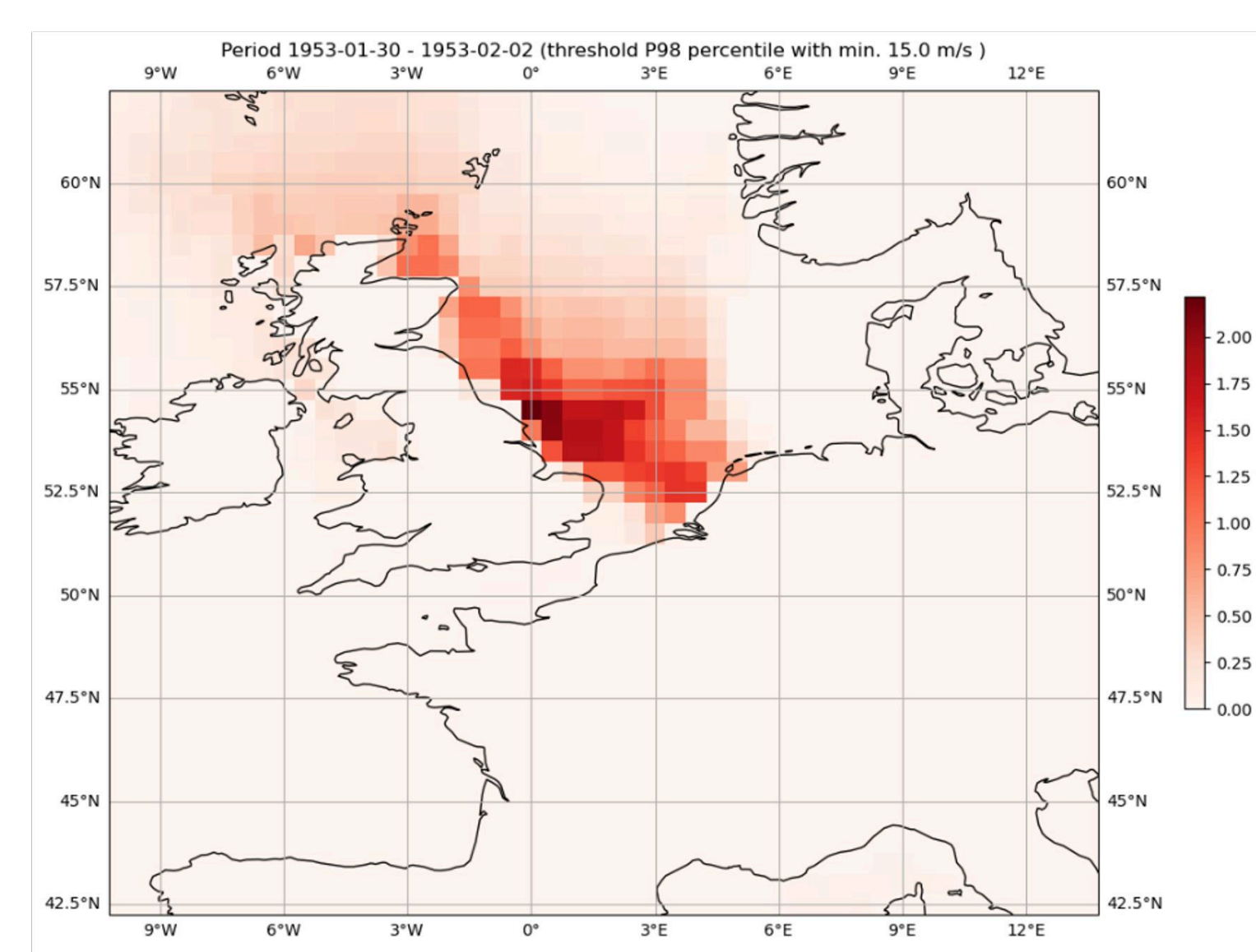
The indicator integrates chlorophyll-a, dissolved oxygen saturation, dissolved inorganic nitrogen and total phosphorus to identify seasonal and depth-dependent trophic conditions and eutrophication hotspots.



STORM SEVERITY INDEX (SSI)

Storm Severity Index products provide spatial and temporal characterization of extreme wind events using percentile-based wind speed exceedance analyses.

Generated outputs include SSI intensity maps, climatological analyses and storm impact indicators derived from ERA5 wind datasets for large-scale atmospheric event assessment.



Example of the spatial distribution of the Storm Severity Index (SSI) during an extreme wind event, highlighting areas affected by exceptional storm intensity based on percentile wind speed thresholds.



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