Spatio-temporal trends of marine heatwaves in the western Baltic Sea between 1950-2022

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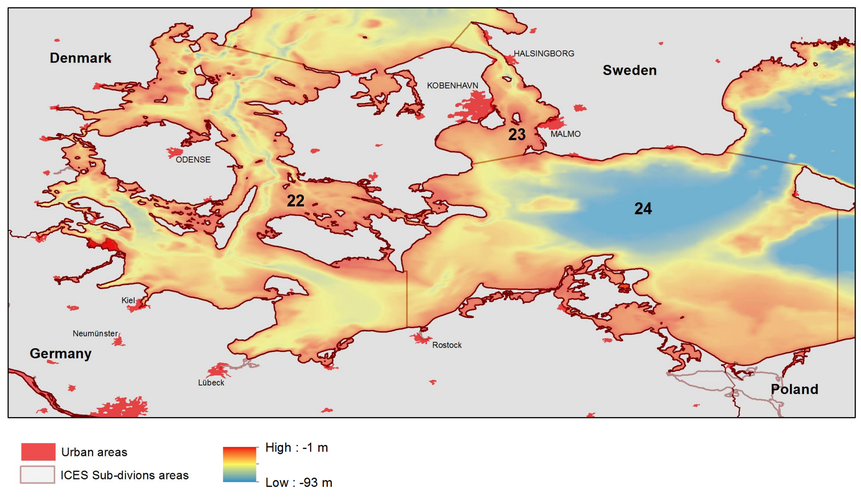
What we are doing and where

- Marine Heatwaves (MHW) defined by Hobday et al. (2016): periods of at least 5 days with the temperature over the 90th percentile from a 30 years climatology
- Are MHWs increasing since 1950s?
- How are MHWs distributed spatially and seasonally?
- Using sea surface and bottom temperatures (SST and SBT, respectively) on a 0.25x0.25° resolution for the Western Baltic Sea (WBS), originated from the Baltic Sea Ice Ocean Model (BSIOM) [2,3], from 1950-2022



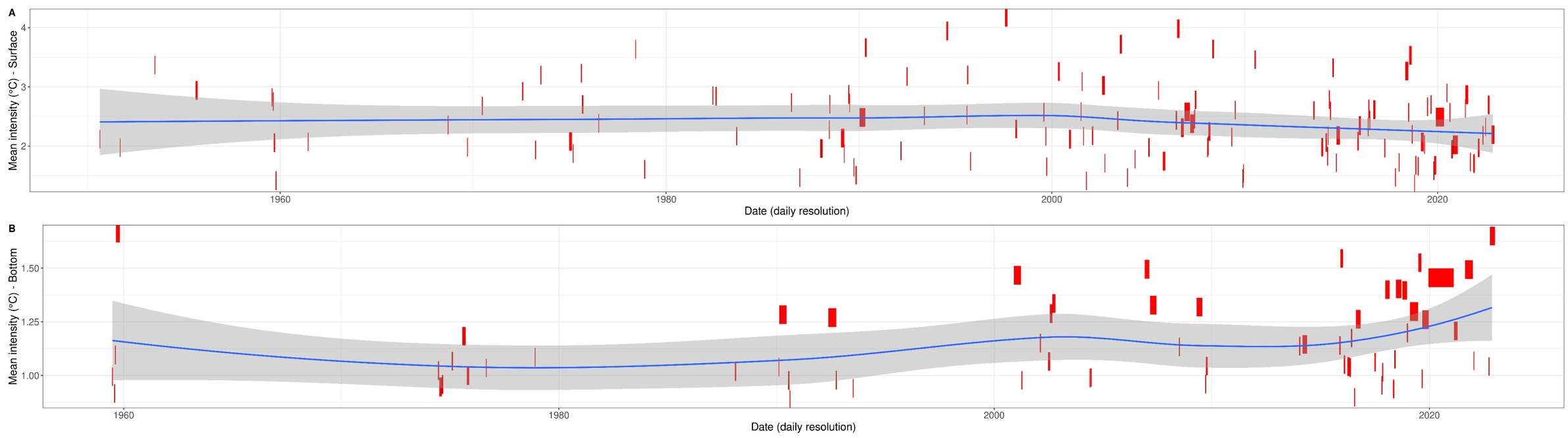


Fig 1: Timeframe with all the MHWs identified from 1950-2022 for surface (A) and bottom (B). The length of the red segments are the length in days of each MHW. The blue line are trend-lines for the intensity (°C) from the MHWs.

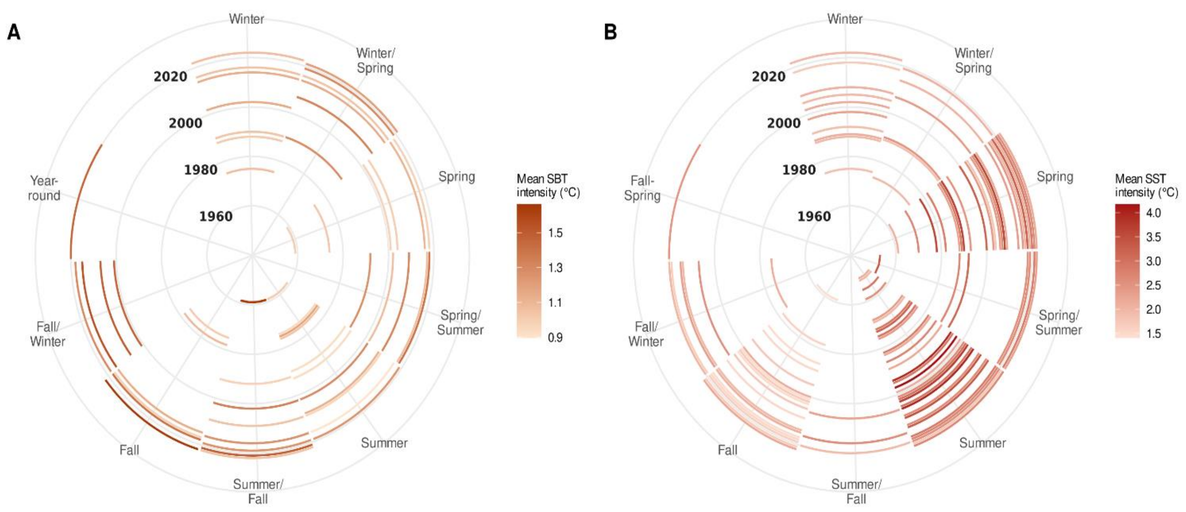


Fig 2: MHW events per season from 1950 (inner rings) to 2022 (outer rings) for bottom (A) and surface (B). The color intensity is the mean temperature (°C) from the MHWs from that season.

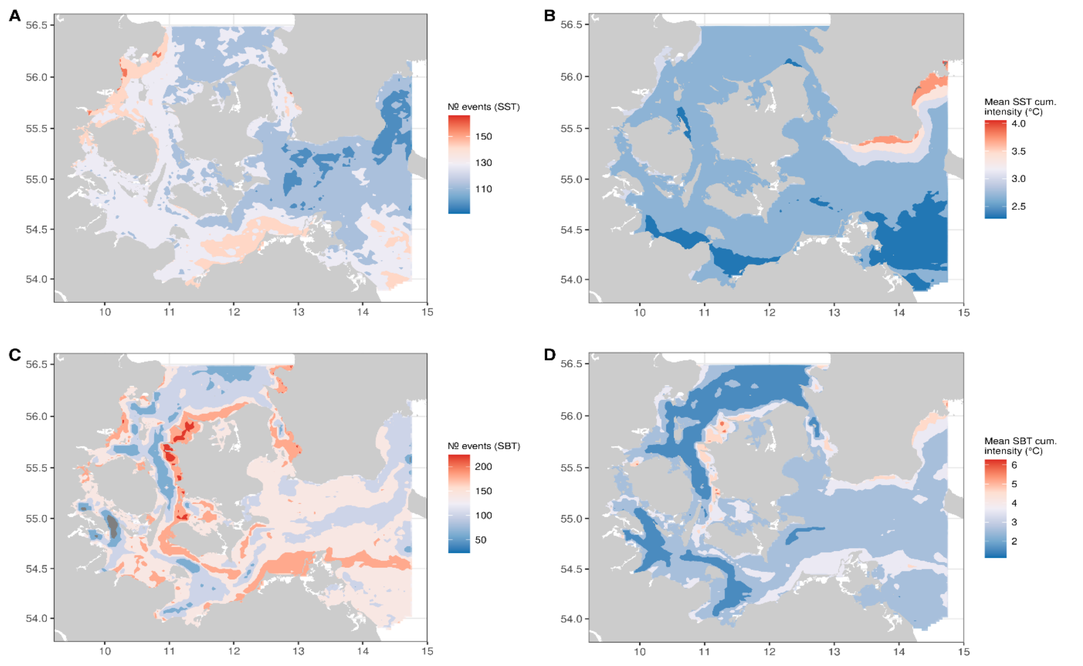


Fig 3: the total number of events for surface (top-left) and bottom (bottom-left), and mean cumulative intensity (°C x days) for surface (top-right) and bottom (bottom-right).

Preliminary results

- The comparison of MHWs' events in the last decade (2013-2022) with the first measured decade (1950-1959) showed:
  - MHWs are becoming more frequent in the surface (475% more events) and at the bottom (~650%)
  - Lasting longer both in the surface (~10 days) and at the bottom (~32 days)
  - The mean intensity did not show much change
- Coastal areas in the WBS seem to be the most affected by MHWs

References

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[2] Lehmann A, Hinrichsen H-H (2000) On the thermohaline variability of the Baltic Sea. J Mar Syst 25:333–357. https://doi.org/10.1016/S0924-7963(00)00026-9

[3] Lehmann A, Krauss W, Hinrichsen H-H (2002) Effects of remote and local atmospheric forcing on circulation and upwelling in the Baltic Sea. Tellus A 54:299–316. https://doi.org/10.1034/j.1600-0870.2002.00289.x

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