ASSESSMENT OF WARM-SEASON SST TRENDS IN THE CURONIAN LAGOON USING REANALYSIS DATA

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The increase in sea surface temperature (SST) is one of the most pronounced signals of climate change in oceans and seas. However, long-term SST trends in shallow Baltic Sea lagoons remain insufficiently studied [1-3]. Shallow lagoons are highly sensitive to changes in the heat balance, seawater exchange, river inflow, wind regime and other factors. As a result, climate change leads to pronounced seasonal and spatial heterogeneity in SST distribution within lagoon systems.

The aim of this study is to assess seasonal (May to September) changes and long-term trends in surface water temperature in the Curonian Lagoon using open-access reanalysis data from the Copernicus Earth Observation Programme for the period 1982 to 2024. The analysis is based on daily high-resolution (0.02°) Baltic Sea Sea Surface Temperature Reprocessed (L4) data provided by the Copernicus Marine Service [4]. Monthly trends in mean surface water temperature in the Curonian Lagoon were evaluated using the non-parametric Mann-Kendall test at a significance level of $p=0.05$.

The results show that surface water temperature in the Curonian Lagoon increased across the entire lagoon area at an average rate of 0.58 °C per year ($p>0.05$). The most pronounced SST increase was observed in June and July, reaching average rates of 0.82 and 0.77 °C per year, respectively ($p>0.05$). Spatial analysis revealed a non-uniform warming pattern within the lagoon. In June, the strongest warming was detected in the southwestern and northern, deepest parts of the lagoon. In contrast, during July the largest warming rates were identified in the shallower southeastern and eastern areas. In August, a statistically significant and spatially uniform warming of approximately 0.46 °C per year was observed throughout the lagoon, decreasing to an average of 0.37 °C per year in September.

These results highlight pronounced seasonal and spatial heterogeneity in SST warming within the Curonian Lagoon and emphasize the importance of long-term, high-resolution datasets for assessing the impacts of climate change in lagoon studies.

Keywords: Sea surface temperature, lagoon, reanalysis data

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