CRUISE REPORT

R/V Aranda

Cruise 08/2023

Vedenvaihto2023

9.- 18. October 2023

This report is based on preliminary data and is subject to changes.

Chief Scientist: Laura Tuomi /Finnish Meteorological Institute

1. Vedenvaihto2023 (Water Exchange 2023) research cruise

The RV Aranda was on research cruise on 9.-18.10.2023. The study areas were the northern Baltic proper, the Åland Sea, the Archipelago Sea and southern part of the Bothian Sea. The overall purpose of the measurement campaign was to collect hydrographic data from these area to evaluate the properties of the water masses transporting between the different basins. During the cruise maintenance, recoveries and deployments of instruments measuring hydrography, waves and currents were made.

Hydrography measurements with shipborne CTD were made in the northern Baltic Proper, Åland Sea, Archipelago Sea, and southern part of the Bothian Sea at 105 stations (Fig. 1). At some of the stations more than one CTD cast was made in order to capture temporal variation in temperature and salinity in addition to spatial one.

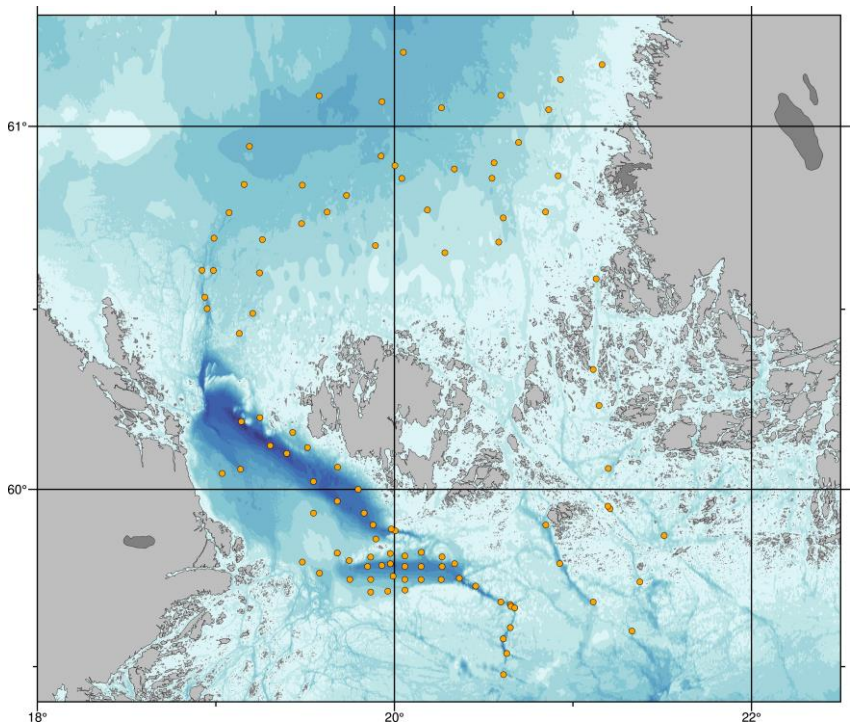

Figure 1. Locations of stations visited during the Vedenvaihto2023 cruise shown with orange dots. Bathymetry source: EMODnet Bathymetry (www.emodnet-bathymetry.eu).

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During the cruise three ADCPs and one wave buoy were recovered, and three ADCPs were anchored close to the Lågskär Deep. In addition, maintenance to FMI's wave buoy near Utö was performed and deployments of automated measurement devices were made (Argo float to Bothnian Sea and underwater Glider to the Lågskär deep).

2. Observations

Measurements of temperature and salinity were done with R/V Aranda CTD. The aim of these measurement was to define the overall hydrographic conditions in the different basins and study properties of water masses transported between the basins.

The CTD measurements showed that surface layer temperatures had cooled down to 8.5 – 12 °C in all the study areas (Fig. 2). Surface layer was warmest in the Archipelago Sea and at areas close to coast. The weather was windy and cold during the cruise and large part of the differences in the surface temperatures are related to temporal variation, not only spatial. In the deeper layers, there was a lot of variation in temperature, which according to preliminary analysis of the data is more related on spatial than temporal differences within and between the basins.

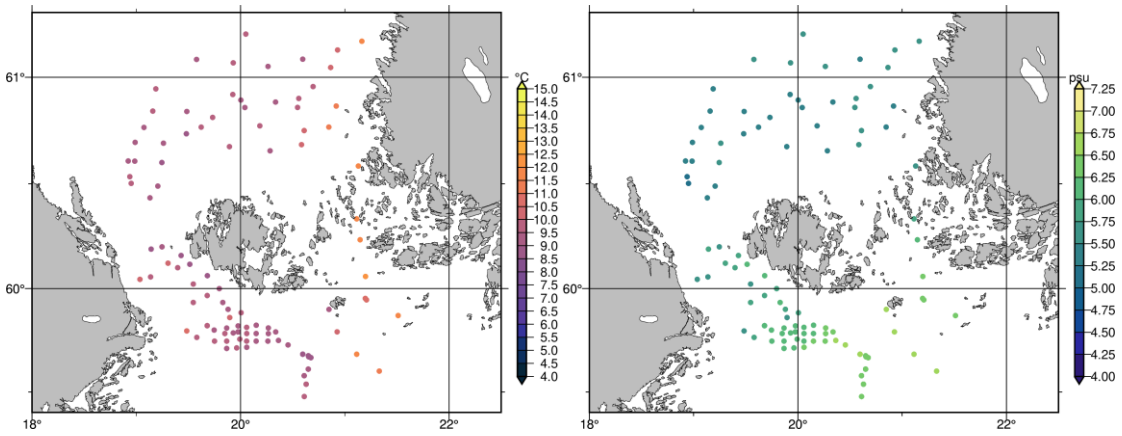

Figure 2. Surface temperature (on the left) and salinity (on the right) at the measurement stations.

The surface layer salinities were between 6 – 6.6 psu in the Lågskär Deep, 5.6 – 6.1 in the Åland Deep and 5.2 – 5.7 in the Bothnian Sea. Similar to the temperatures, there was large spatial variation in the lower layer salinities, visible especially in the Lågskär Deep and in the Bothnian Sea. The deepest parts of the Åland Deep had the smallest spatial variation in salinity.

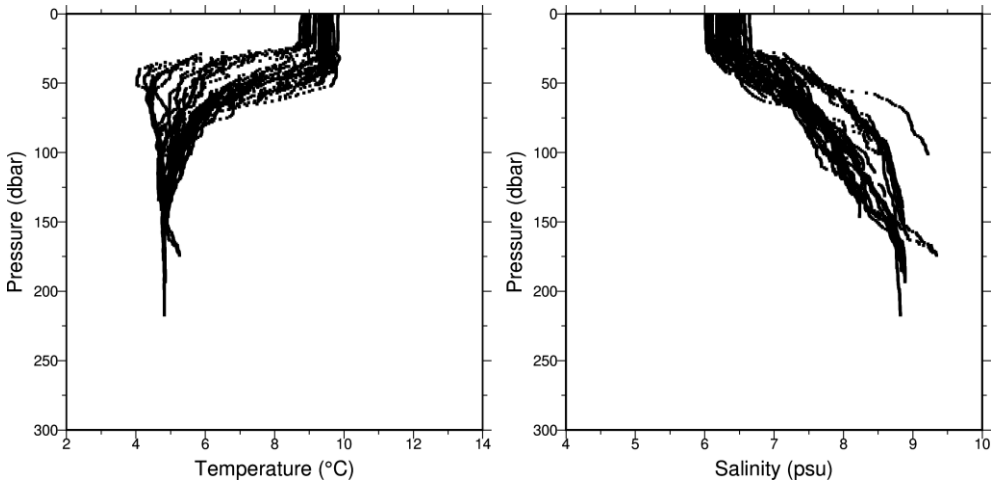

Figure 3. Temperature and salinity profiles measured from the Lågskär Deep and northern Baltic Proper.

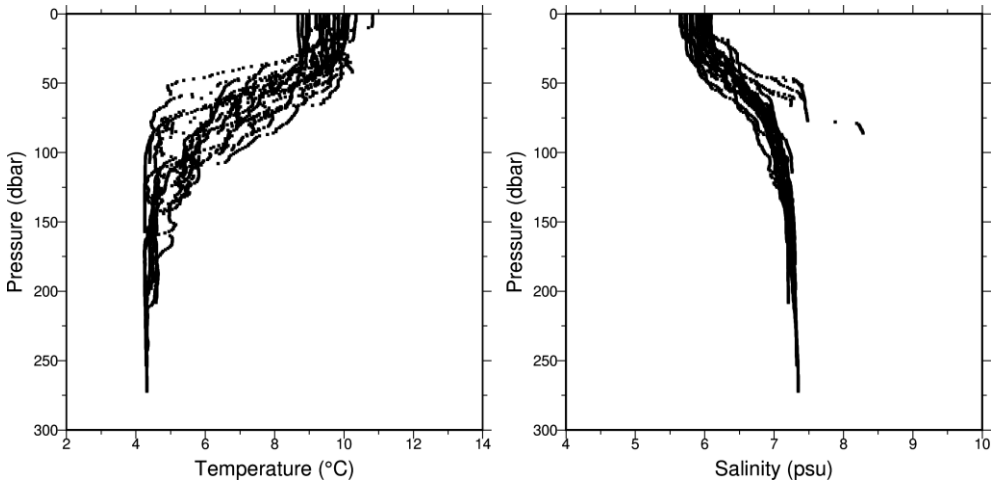

Figure 4. Temperature and salinity profiles measured from or close to the Åland Deep.

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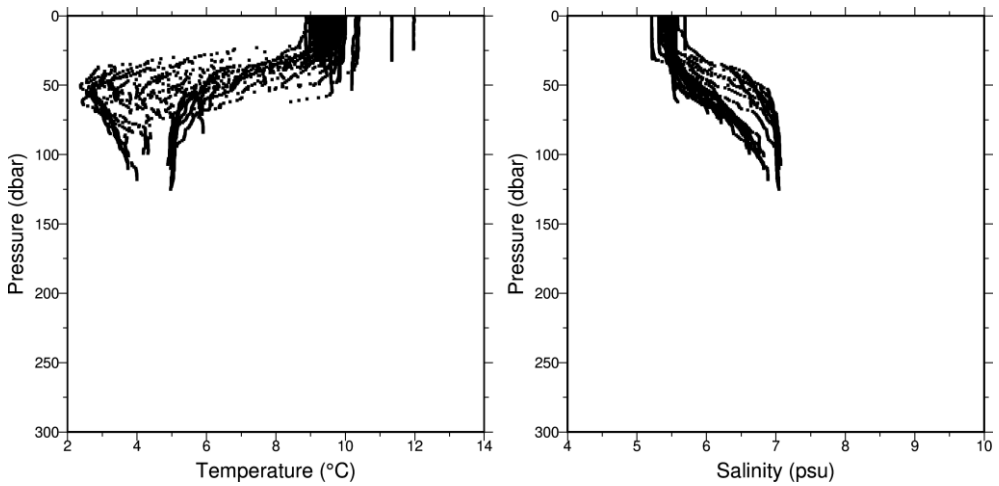

Figure 5. Temperature and salinity profiles measured from the Bothnian Sea.

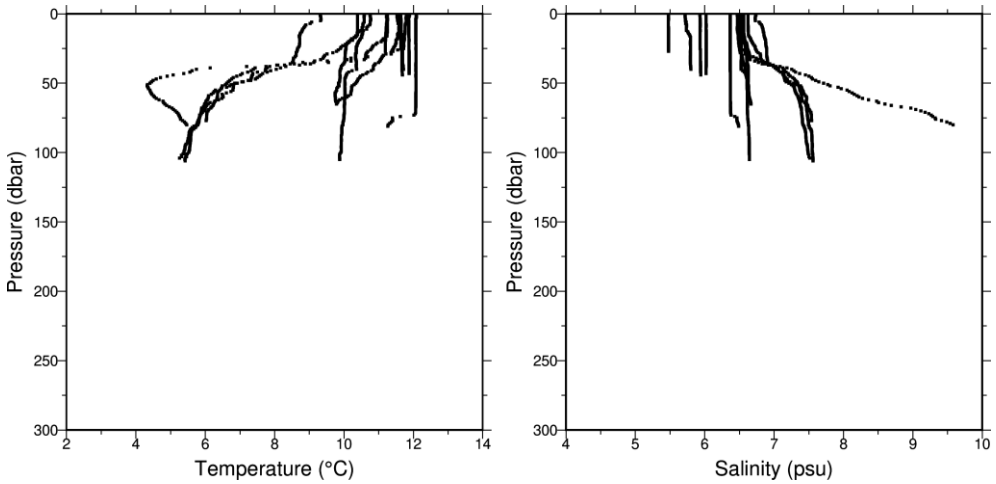

Figure 6. Temperature and salinity profiles measured from the Archipelago Sea and stations close to the southern edge of the Archipelago Sea.

3. Participants

Scientific crew	Organistation	Contact details for data	Dataset
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