## Degree project Master programme

Subject field: Ecology, Biogeochemistry, Marine

Title: Regulating factors for development of hypoxia in the Baltic Sea.

Project period: Spring or autumn 2024. 30 to 60 credits.



Figure 1. A rosette sampler with CTD sond collecting water samples from selected depth simultaneously as profiling temperature, salinity and several other variables.

**Background:** Oxygen consumption is relevant for the development of hypoxia, an environmental concern in aquatic ecosystems. Respiration is one of the most important processes consuming oxygen in the biosphere and an integral part in the metabolism of all living organisms. This is simultaneously coupled to the release of  $CO_2$  causing climate change effects. The knowledge of interaction between temperature and availability of organic carbon substrates for regulation of respiration in organisms is limited. The temperature sensitivity (Q<sub>10</sub>-factor) is crucial for assessing causes of hypoxia and projecting effects of climate driven temperature increase.

This study aims to advance the understanding of temperature control of respiration and its interaction with substrate supply in sub-Arctic conditions.

**Overall aim**: Develop effective management measures to mitigate hypoxia.

**Research question**: Is plankton respiration more temperature sensitive at higher substrate supply during the spring bloom? Can measurements be corrected for temperature driven oversaturation?

**Method**: The sensitivity to small temperature changes in steps of 1 °C will be investigated before, during and after the spring bloom in the northern Baltic Sea. The project can be both done by theoretical analysis of existing data and include additional field measurements at Sea. Respiration is measured by a sensor-based technology using incubator with Peltier-element technique. The field work will be done in the Baltic Sea coupled to a running monitoring program.

**Workplace**: Dep. of Ecology and Environmental Science and partly at Umeå Marine Sciences Centre (UMF), Norrbyn. Public transport to UMF is available and accommodation at the UMF hostel free of charge is also possible during field work.

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