Data, Observation & Modelling

Fri. Nov 13, 2026 9:00 AM - 10:30 AM JST | Fri. Nov 13, 2026 12:00 AM - 1:30 AM UTC | Room A (Oshidori) (2F)

Oral A4 Ocean Observing Systems and Data Quality

Chair: Sigmund Kluckner, Takeshi Doi

9:00 AM - 9:15 AM JST | 12:00 AM - 12:15 AM UTC

[MBtCkkTq-01] A smart buoy network for digital representation of the Estonian marine areas

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High-quality environmental and navigational information is essential for maritime safety and security, sustainable management of the marine environment, and the development of the blue economy. The Estonian MEREHUNT project is developing an integrated marine observing and data management system to support a future digital twin of Estonian marine areas.

During its first phase (2025–2027), MEREHUNT will develop and deploy up to seven prototype autonomous observing platforms of three types designed for different operational environments and measurement needs. Larger platforms will incorporate profiling systems for observing the vertical structure of the water column, while camera systems on most platforms will provide complementary information on sea state, marine traffic, and potential pollution events. The network will combine observations from the attached wave and current profilers and dedicated surface current recorders. Modular sensor integration will also enable testing of emerging technologies for variables that remain challenging to observe autonomously, including nutrients, pCO_2, etc.

The prototypes will be evaluated through concrete operational applications, including providing real-time environmental and navigational information for remote vessel piloting, detecting marine pollution, supporting drift forecasting, and improving characterization of hydrodynamic and biogeochemical conditions.

Observations will be integrated into a common data platform that provides data transmission, processing, quality control, storage, visualization, and fit-for-purpose services for different users, with connections to national, regional, and European marine data infrastructures. The system design builds on consultations with governmental agencies, maritime industries, offshore wind and aquaculture developers, environmental and rescue organizations, scientists, and the public. By integrating multi-purpose autonomous observations, interoperable data infrastructure, and operational demonstrations, MEREHUNT provides a practical pathway from marine monitoring toward a dynamic digital representation of Estonia’s marine environment for data-driven decision-making.

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