Data telemetry systems to access climate sensitive data from moored instrumentation

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Introduction

Timely and save data retrieval from moored instrumentation is important for scientific investigation and for monitoring the marine environment. In cases where moorings do not reach to the surface or the installation of surface telemetry is not possible - subsurface telemetry systems are required. Here we report about two subsurface data retrieval systems.

The systems are designed and tested as part of the EU project THOR. The "Bergen System" is based on an acoustic modem/logger technology. The data from the moored instrumentation is stored and delivered *on demand* to a counterpart modem installed on a passing-by ship. The "Kiel System" is based on the release of data capsules. The data from the moored instrumentation is stored in a central unit and distributed to expandable pop-up buoys that are released at predefined times and that are capable of sending the data via satellite communication to shore.

Specification

Kiel-System

- *Maximum deployment depth:* 6000m
- *Maximum deployment duration:* at least 2 years
- *Frame/Floatation:* Steel 1.4539, requires approx. 100 kg of additional buoyancy support
- *Link to deep sea instrumentation:* Serial connectors for on-board instrumentation and inductive link to steel wire mooring instrumentation
- *THOR configuration:*
4 x pop-up capsules, 1 x central unit (CU)
3 x serial connections RS232 (ADCP, SBE 37SM, Optode)
1 x inductive link: SeaBird IMM protocol (SBE37IM, Optode)

- *Data collection & retrieval:*
Data is always copied (via Infra-red link) from CU to all remaining pop-up buoys. Data is packed "last data send first".
Each capsule has own burn wire release, which is free programmable (during system set up). The capsules has a GPS tracking available – to enable a recovery of the pop-up buoy.
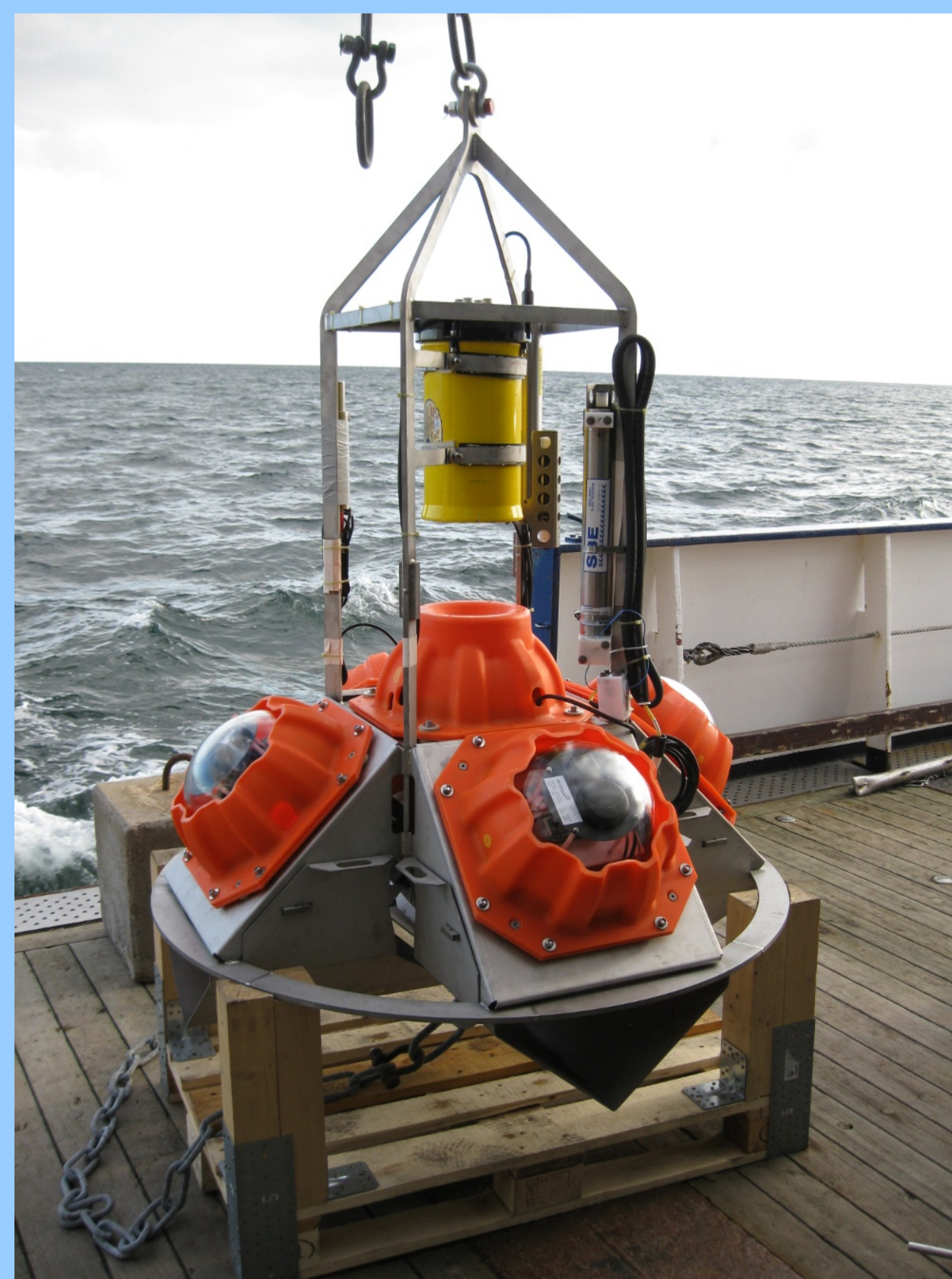
Bergen-System

- *Maximum deployment depth:* 750m or 1500m
- *Maximum deployment duration:* up to 5 years
- *Frame/Floatation:* Stainless steel 316L, Flotec™ syntactic foam
- *Link to deep sea instrumentation:* All on board with serial connectors

- *THOR configuration:*
1 x HAM.NODE based Develogic acoustic modem/logger
1 x serial connection (AADI RDCP600 acoustic current profiler with T, C, P, optode). 3 x batteries containers, 1 x SIS Argos bacon SMM2000

- *Data collection & retrieval:*
Data is logged in instrument and in the HAM.NODE modem (redundancy). Acoustic retrieval is initialized by trigger signal transmitted from surface modem (e.g. ship, AUV).
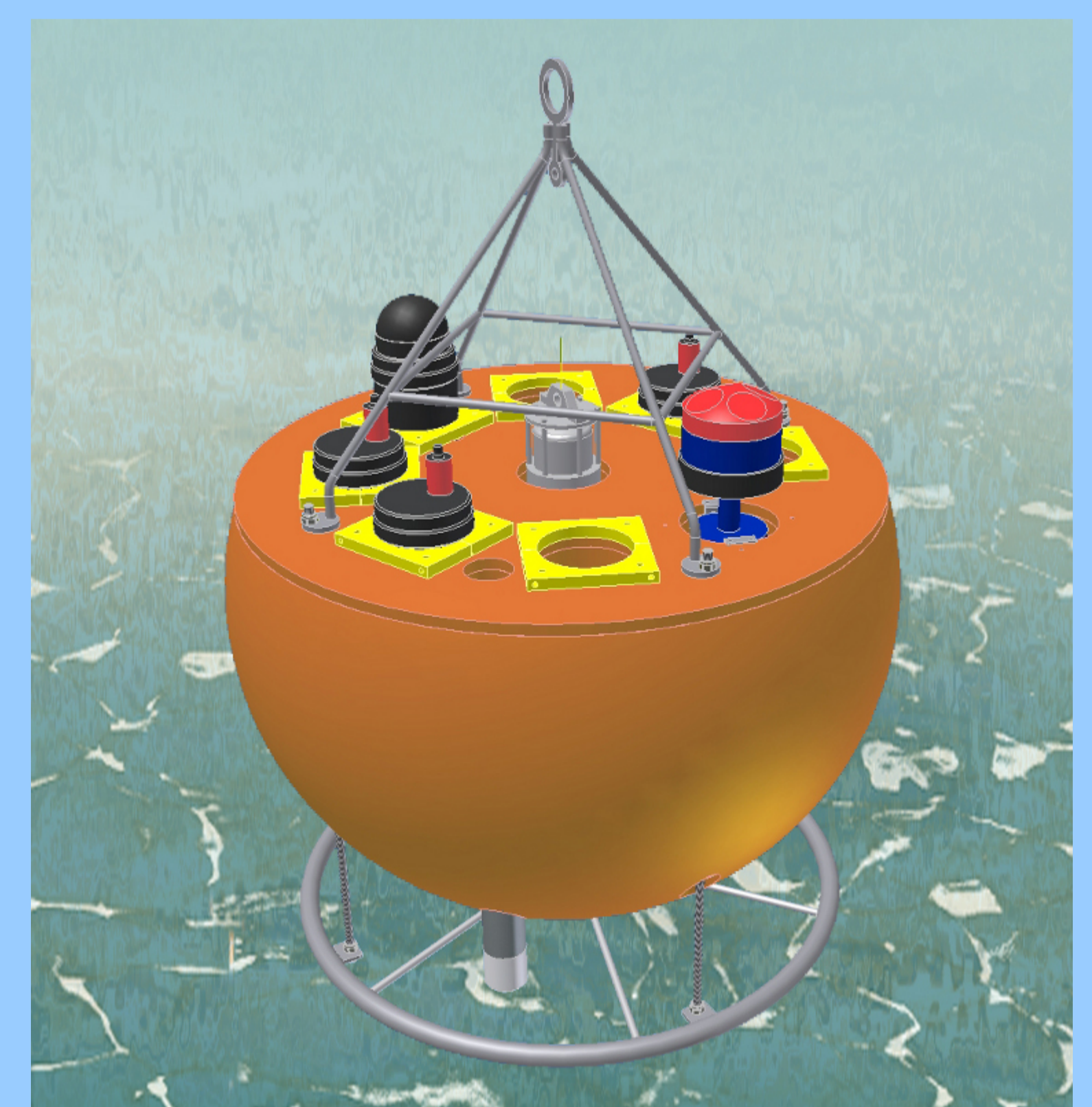
Tests and conclusion

Laboratory and shallow water tests have been done with both aystem before a first deep water installation.

The Bergen system is now deployed in the Faroe Bank Channel. Data was downloaded in June 2010 and the system was reprogramed. The Kiel will be deployed in August 2011 in the Irminger Sea.

To take benefit from both systems a merging of the concepts is planned. For a merged system any ship based acoustic data retrieval will automatically postponed the launch of the pop-up buoys for user defined period. This strategy will minimize the use of the "expandable" pop-up's and may extend the deployment periods to even longer time intervals (>5 years).