

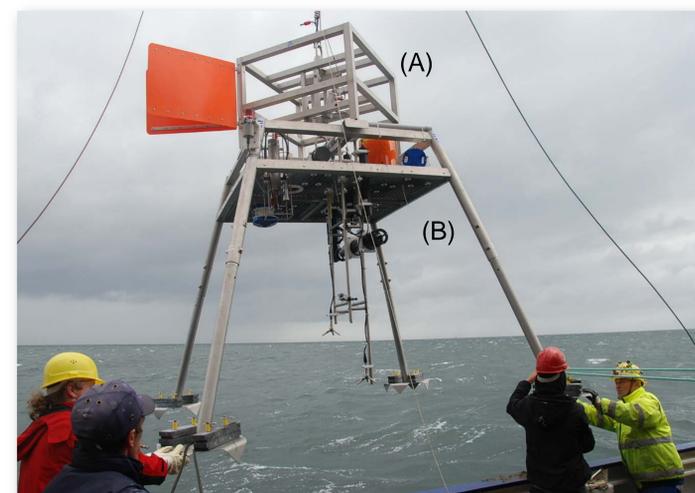
### In-situ measurements of seafloor physical processes

#### Abstract

The SedObs Lander system aims at a high resolution observation of physical properties of the water-seafloor interface. A variety of sensors for the detection of biogeochemical parameters (temperature, salinity, oxygen, pH), water turbulence, current velocity, sedimentology, and morphology are mounted on a lander system for autonomous deployments for periods of tides to days.

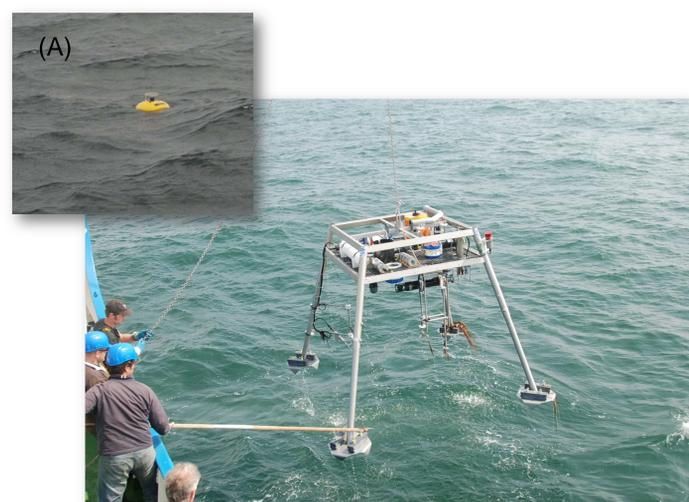
#### Lander system

The SedObs observatory system is built up by a launcher and lander (KUM Kiel; designed by MARUM and KUM) and several autonomous instruments: An upward looking TRDI ADCP Model WHM600 records current profiles and waves over the lander. A downward looking TRDI ADCP Model WHM1200 measures current profiles and backscatter strength below the lander. Pointwise velocity / turbulence statistics are derived by two Nortek Vector Velocimeters in different heights above the bed. The grain size composition of suspended sediments are measured by SEQUOIA LISST 100X. A Sea- and Sun CTD combines sensors for the COSYNA base parameters pressure, temperature, conductivity, chlorophyll, pH, turbidity, and oxygen. An UNISENSE Eddy Correlation system additionally measures oxygen dynamics to derive primary production. Microbathymetry and bed roughness are measured by a Marine Electronics 3D Profiler and an IMAGENEX Scanning Sonar 881A.



**Deployment of SedObs lander system**

A launching unit (A) rotates the lander into the direction of flow before the lander (B) comes to a rest on the sea bed. The launcher then is released from the lander and recovered. The lander system stays on the bed autonomously.



**Recovery of SedObs lander system**

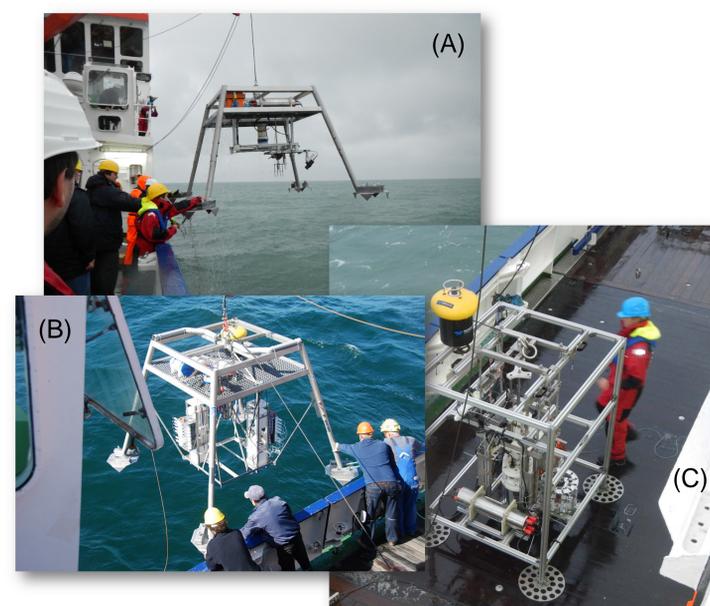
After the measuring period a pop-up buoy (A) is released by an acoustic trigger. The pop-up buoy floats to the water surface, connected to the lander by a leash. The pop up buoy is recovered on board, and the lander is heaved by a ship crane.

#### Scientific projects

Currently the COSYNA SedObs observatory system is applied in two research projects: In the MARUM project SD1 "Bridging scales: From small-scale morphological and sedimentological features to coast and shelf systems" the (re-)suspension of bed sediments in turbulent structures is explored. In the project TP2 of the BMBF funded NOAH - North Sea Observation and Assessment of Habitats project small scale morphodynamics and sea bed roughness is quantified at exemplary regions of the German North Sea. Deployments at sea are combined with ship based measurements and other observatory deployments.

#### Measuring strategy

The SedObs observatory system has been designed for operation from small (e.g. FK Senckenberg) to mid size (e.g. FS Heincke) research vessels. The common deployments are prepared by pre-site investigations by ship board multibeam echo sounder bathymetric soundings, and local grab samples. Observation periods are from single tidal cycles to several days, depending on weather conditions and ship time. Although the instruments are operating in autonomous modes, the accompanying ship does not leave the region of the lander position due to risk of damage by fishing activity or else. The lander system has been proved to be stable in storm conditions in the North Sea.



**Simultaneous deployment with other systems**

SedObs measurements are combined with deployments of other systems like the MPI-MARUM lander LANCE (A), the COSYNA lander NusObs (B), or the MPI-HZG lander SANDY (C).