

RESEARCH VESSEL PROGRAMME

**RV CEFAS ENDEAVOUR
Survey: C END 02 - 2019**

STAFF:

Name	Role	Cabin	Shift
Elisa Capuzzo	SIC	B1	Day
Dave Pearce	2IC / Mooring	C2	Day
Oliver Twigge	Mooring/Chem	C3	Day
Eric Fitton	Mooring	C6	Day
Axayacatl Molina-Ramirez	Mooring/Chem	C5	Day
Naomi Greenwood	Mooring/Chem	B2	Day
Uwe Posner	FerryBox	C7	Day

DURATION: 27th January to 2nd February 2019
MOBILISE: LOWESTOFT
DEMOBILISE: LOWESTOFT
OPERATION AREAS: North Sea

AIMS:

1. Service SmartBuoys at Dowsing, Warp and West Gabbard (SLA25G – 2.5 day)
2. Service Waverider at Firth of Forth, Tyne/Tees, Torness and South Knock (C6029A – 2 days)
3. Service South Knock and Southwold guard buoys (C6029A – 0.5 day)
4. Service landers and water samples at Vattenfall Vanguard (C7311B – 0.5 day)
5. Service landers and water samples at Vattenfall Boreas (C7645B – 0.5 day)
6. Service noise landers at Dowsing and Warp (SLA20A – 0.5 day)
7. Recover lander and guard buoy on War Mehtar (C6107M – 0.5 day)
8. Underway nutrient sampling using the FerryBox water sampler
9. Collection of a zooplankton sample at West Gabbard
10. Collection of water samples from the inner to the outer Wash
11. Collection of surface seawater sample for DOM (Dissolved Organic Matter) extraction for use in experiments at UEA (part of the REMAIN project)
12. Service of the FerryBox by 4H Jena engineer

Summary:

The RV Cefas Endeavour sailed at about 22:00 on Saturday 26th January 2019 and steamed towards the West Gabbard 2 SmartBuoy. At the site, a CTD/Rosette profile was carried out (27th January, 02:53) for collecting of water samples (dissolved oxygen, salinity, inorganic nutrients,

chlorophyll and suspended particulate materials - SPM), followed by recovery of the SmartBuoy (03:52) and deployment of the new buoy (04:25). Activities at the station were completed by 5:00 with another CTD/Rosette profile and a zooplankton ring net haul. Operations were carried out within an optimal weather window, before arrival of strong NW winds. The Endeavour proceeded towards South Knock, where the Waverider and guard buoy were serviced in the morning of the 27th January, with all operations on site completed by 12:31. Underway sampling of subsurface water for analysis of chlorophyll, salinity, SPM and dissolved nutrients was carried out, from the flow-through of the FerryBox, during the steam to the Warp SmartBuoy site. At the Warp, operations started with the recovery of the noise lander; after recovering buffs and clump (15:57), the ground wire connecting the lander to the clump snagged underneath the ship. The crew tried for several hours to free the wire but eventually it parted. It was decided to suspend operations for the day and drop anchor in proximity of the site.

The Warp SmartBuoy was serviced in the morning of the 28th January (recovery at 09:28 and deployment of the new buoy at 10:06) with water samples collected with the CTD/Rosette before and after the maintenance of the buoy. Successively, the new noise lander was deployed (11:16). The RV proceeded locating the position of the old noise lander with a Sonardyne box; the lander responded to the pinger, so it was possible to identify the area where it is located. We then run out of time at the site and proceeded north towards Southwold. The SmartBuoys (West Gabbard and Warp) were stripped during the transit from Warp to Southwold; hourly water samples for nutrients, chlorophyll, salinity and SPM analysis were also collected underway from the flow-through of the FerryBox. The guard buoy at Southwold was serviced at 18:39 with all operations completed by 20:00. The Endeavour steamed north to Dowsing.

In the morning of the 29th January, the SmartBuoy and noise lander at Dowsing were serviced. All the operations at the site were completed by approximately 11:00, with CTD/Rosette profile and sample collection carried out before and after the SmartBuoy service. During the transit northwards to service the Waverider at Tyne/Tees, hourly underway sampling was collected from the flow-through of the FerryBox. The Waverider at Tyne/Tees was serviced in the early evening, with deployment completed at 20:40. The RV steamed towards the Firth of Forth Waverider.

Operations on the 30th January started with a toolbox talk (as done at each sampling site of the survey, prior initiating operations), followed by recovery of the Waverider at Firth of Forth (07:27); the new Waverider was deployed at 08:20, after which the RV proceeded to the site of Torness power station. On arrival, after informing the power station of the operations planned and after carrying out the relevant toolbox talk, the guard buoy and the Waverider were recovered (at 09:53 and 10:13, respectively). All operations on site were completed by 11:21 with the deployment of the new guard buoy and Waverider. Sea state and weather conditions were good throughout operations with slight swell and wind speed less than 15 knots. While steaming towards the Vattenfall Norfolk Boreas site, a fire drill was carried out with demonstration of EEED (Emergency Escape Breathing Device). Underway water sampling was carried out every 2 hours for the rest of the afternoon from the flow-through of the FerryBox, and at night with the FerryBox water sampler. Comparing the water depth reading from the

Echosounder (EK80) and the altimeter on the Rosette it appeared that the depth reading of the Echosounder was not correct and required an adjustment of approx. – 4.5 m. All prior depth measurements recorded from the start of the survey were corrected by this factor.

The landers at the two Vattenfall sites (Boreas and Vanguard) were serviced on the 31st January. The same procedure and order of operations was followed at each of the two sites; after the toolbox talk, a CTD/Rosette profile was carried out for collection of samples of SPM and salinity near the sea floor. The acoustic release of the lander was then activated, and the released buoys were grappled to retrieve the lander. Subsequently, the ground wire and clump were recovered. Another CTD/Rosette profile was carried out at the end of operations with further collection of SPM and salinity samples. Operations at the Boreas site lasted between approximately 7:00 to 10:30, while at the Vanguard site between approximately 13:00 to 17:00. Weather and sea state were generally good throughout operations with slight swell and light air. In the evening the lander and guard buoy at the War Mehtar site were recovered with operations concluded at 20:30. The Endeavour proceeded steaming to the inner Wash.

The 1st February was spent collecting water samples for analysis of oxygen, nutrients, chlorophyll, nutrients and salinity from the CTD/Rosette and the FerryBox flow-through from the inner to the outer Wash area, then along the Norfolk coast. At the same time, the remaining buoys were stripped and washed, with the gear packed in calicos. A final water samples for DOM (Dissolved Organic Matter) extraction for use in experiments at UEA was collected before returning to Lowestoft, on the 2nd February on the morning tide (pilot at 06:00 am).

The water sampler of the FerryBox collected samples for analysis of dissolved nutrients every night while steaming.

The 4H Jena engineer serviced the FerryBox prior and during the survey. At its 9th year of service, it emerged that the FerryBox pipework and computer have been damaged/corroded by the continuous exposure to seawater and sea air and some components are no longer replaceable. A rebuilt of the system is currently considered.

Finally, during the survey, the positions of each new deployment (e.g. SmartBuoy, Waverider, guard buoy, lander) have been updated on Transas as soon as operations on site were completed. After discussion with the Master, it was agreed that this good practice should be included as part of the SOPs for deployment of SmartBuoy, Waverider, guard buoy and lander.

Elisa Capuzzo
Scientist in Charge
04/02/2019