AlterEco cruise#8: Cruise report

FV Fidelity Royal 24th April 2019

1. Project overview:

An Alternative Framework to Assess Marine Ecosystem Functioning in Shelf Seas (AlterEco)

The overarching aim of AlterEco is to develop a novel monitoring framework to deliver improved spatio-temporal understanding of key shelf sea ecosystem drivers. To achieve this, AlterEco will use marine autonomous vehicles to provide long-term, multi-variable ocean measurements that will help develop greater understanding of the physical and biogeochemical functioning of the continental shelf system. The project will enable a series of missions over a 14-month period with multiple vehicles on a region in the North Sea that undergoes considerable spatial and temporal variability.

The project has the following deliverables:

1. utilise the latest autonomous technology to provide sufficiently high temporal and spatial resolution of meso and sub-mesoscale processes to better understand the impacts of inter-annual variability on the functioning of the shelf sea ecosystem,
2. provide the tools necessary for informing operational forecast models of the stressors on and consequences of the environmental status of shelf seas,
3. provide a modular, integrated framework for an efficient, diagnostic monitoring regime for continental shelf seas that has global transferability.

2. Personnel on board:

Crew: Stuart (captain)

Science personnel (affiliation): Matthew Tobeman (SAMS), Stephen Woodward (NOC).

3. Cruise objectives:

This is the 8th of 9 planned AlterEco deployment/recovery cruises. Cruise objectives were to,

1. Recover Nutrient enabled sea glider 602 (Scapa).
2. Collect CTD profiles and discrete water samples for calibration of glider sensors.

Deployment, recovery, transect and waypoint locations are shown in figure 1.

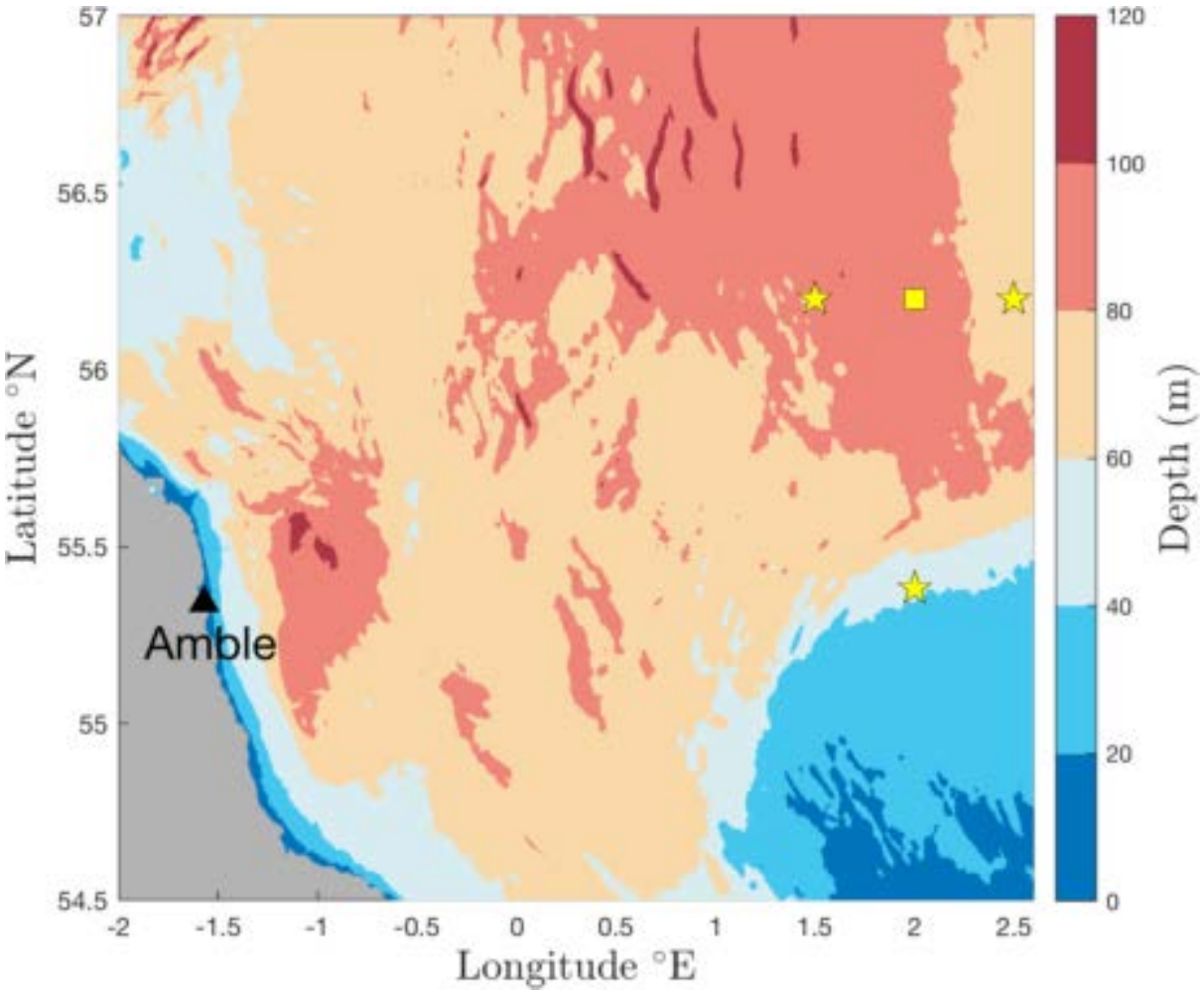

Figure 1: Nominal deployment/recovery site (yellow square) and planned survey location waypoints (yellow stars) Bathymetry (metres depth) indicates the coastline in black.

4. Cruise narrative (all times GMT 2019):

Wednesday 24h April

CTD and glider recovery equipment loaded on to vessel, FV Fidelity.

18:00 departed Amble harbor, sea state was relatively rough with ~2m swell, and moderate winds. Headed to recovery location.

Thursday 25th April

12:15 arrived at position of latest Glider - 602 GPS position.

12:45 602 sighted

12:50 56° 13.056’ N , 02° 00.063’ E Glider - 602 Brought back on board with no damage using boat hook and rope hauled by hand.

13:15 CTD conducted at position 56° 13.052’ N , 02° 00.061’ E

CTD Summary.

Figure 2 displays temperature and salinity profiles from both the calibrated SB16 CTD and uncalibrated SB19 CTD. There does appear to be some stable temperature and salinity stratification, however when compared to that of the previous ALTERECO cruise. Changes in temperature and salinity with depth are very small.

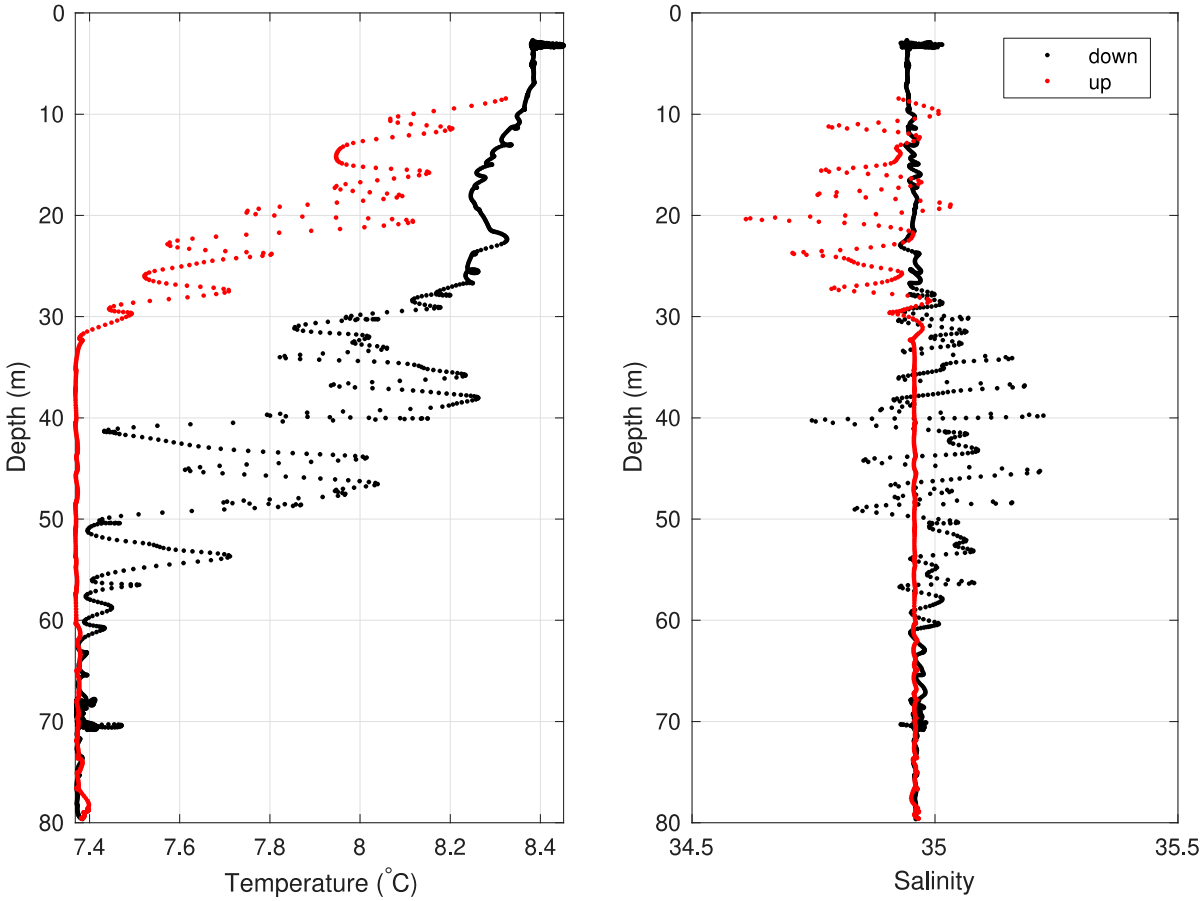

Figure 2: Temperature and salinity as a function of depth from the SB19 CTD (black and red markes are data from down and up casts respectively)

Tables 1 and 2 detail the water sample bottle numbers and the corresponding water depths for oxygen and salinity measurements.

Oxygen

Bottle Number	Temperature at Fix (Deg)	Depth (m)
238	8.5	4.2
233	8.6	4.2
226	8.7	4.2
281	8.5	68.8
282	8.3	68.8
235	8.2	68.8

Table 1 Oxygen sample bottle numbers, fix temperature and depth from which water was taken.

Salinity

Bottle Number	Depth (m)
3	4.2
4	4.2
1	68.8
2	68.8

Table 2 Salinity sample bottle numbers and depth from which water was taken.

Nutrients

Bottle Number	Depth (m)
16	4.2
17	4.2
24	4.2
14	68.8
7	68.8
21	68.8

Table 2 Salinity sample bottle numbers and depth from which water was taken.