Post Mission Report

‘Altimeter testing with two seagliders’

Team Leaders
Technical: Simó Cusí (SC)
Operations: Carlos Castilla (CC)

Additional Team Members
David Roque (DR)
Benjamín Casas (BC)
Miguel Martínez (MM)

Launch date	06/03/2012
Launch location	Andratx
Glider	538-sdeep02, 541-sdeep03 iRobot Seaglider 1KA
Duration of mission	1 day
Recovery location	Andratx

1.0 Plan

1.1 Operations

Distance from port to Launch is 3nm, about 20 min sail (Fig 1). Valiant vessel will be used.

Field team will be composed of SC, DR and CC with BC as a backup. SC will pilot using 3G connection at Base point and MM will be the backup pilot at IMEDEA. Communications will be via VHF and GSM as a backup.

DR will learn how to perform a Selftest and set the glider to 'travel mode' after recovery so that next deployment/recovery the pilot can stay at IMEDEA with reliable internet connection.

One profile will be taken with one Seabird CTD and 3 Castaway CTDs attached to the same structure. SCB-CAST001 showed an abnormal salinity profile during last mission, GF-MR-0003, so that Castaways should be checked.

Will check the cradle improvements (handles and wheels) ease the glider transportation (20120301_IS_538_a and 20120301_IS_541_a).

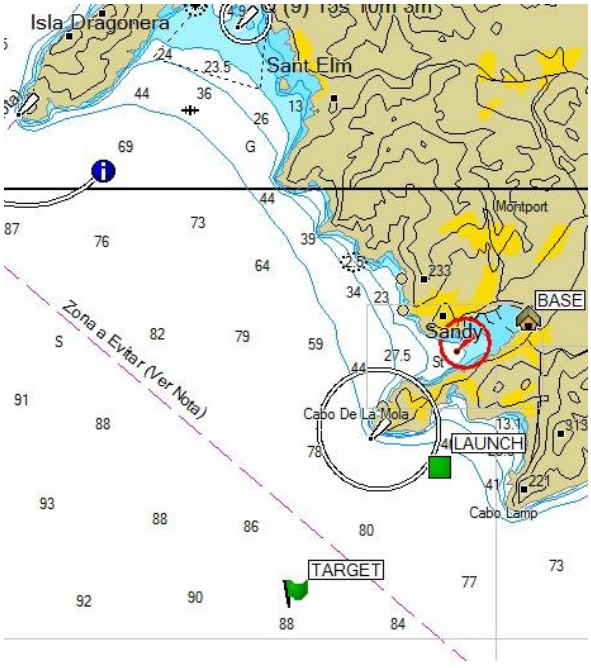

Fig 1: Planned working area for the mission

1.2 Piloting and Technical

Test gliders detect the bottom properly without giving false positives or hitting the ground.

Check sg538 climbing behaviour. Plots in GF-MR-0003 show the glider was climbing with negative pitch which would indicate the buoy or the tether was pulling too strong on the glider or the trimming was extremely bad. Gliders will be untethered for first time.

Check the gliders are located via Argos, especially sg538.

1.3 Scientific

Will gather CTD, FLNTU and Oxygen. Will compare gliders' CTD profiles to SBE and see how Castaways perform.

2.0 Events

2.1 Operations

Everything worked as planned and no operational problems arouse. 3G internet connection was very reliable. BC took CC's place for sg538 deployment and recovery and got used to Seaglider operational procedures. VHF was very useful. In a few cases it did not work and GSM phone calls or WhatsApp messaging were used.

2 CTD profiles were taken.

Cradle improvements, handles and wheels, proved useful (Fig 2). Especially if the port requires long walks between van and vessel.

Fig 2: cradle modification for better transportation

2.2 Piloting and Technical

sg541 detected the bottom with high precision using ALTIM_PULSE,3 and ALTIM_SENSITIVITY,3. However it detected the ground when it was 17 meters from it, which is not enough margin for the apogee.

sg541 apogees doing a kind of W which means a lot of trimming is needed. Especially VBD (Fig 3).

sg538 did not detect the ground as less dives could be done. However ALTIM_PULSE,3 and ALTIM_SENSITIVITY,2 could be tried and gave a false positive.

sg538 climbed as it did during GF-MR-0003 so that the tether was not causing the unstable climb. The glider needs to be trimmed, specially its c_pitch (Fig 4).

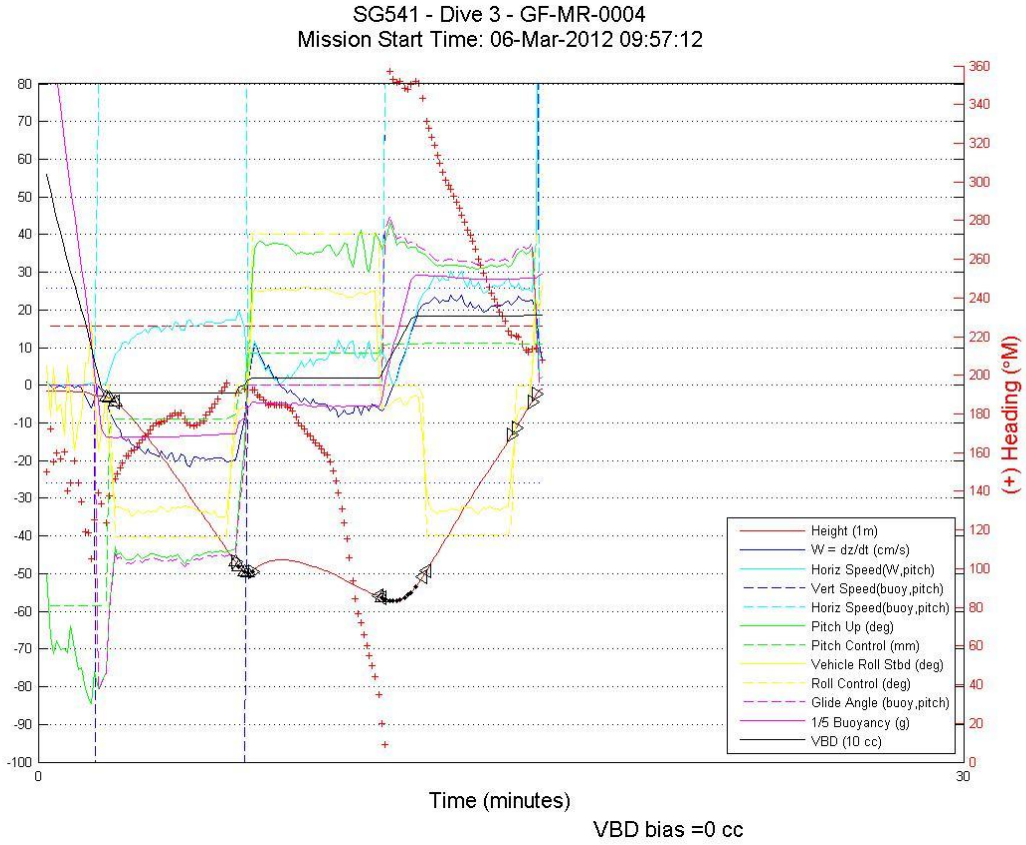

Fig 3: sg541 irregular apogee

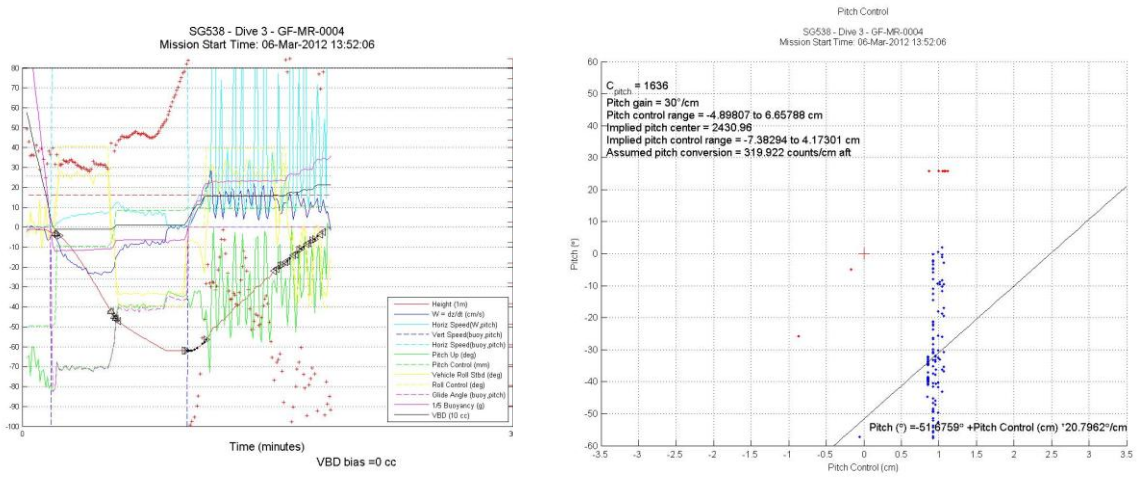

Fig 4: sg538, unstable pitch in green on the left and Pitch control plot on the right

2.3 Scientific

Three Castaways (SCB-CAST001, SCB-CAST003 and SCB-CAST004) were attached to the SBE-25 structure and 2 profiles to 25 meters were taken by hand.
Only the last profile was valid as in the previous no Castaway collected data due to bad configuration. SCB-CAST003 did not collect data during the second profile either.

3.0 Results

3.1 Operations

Improvement on Castaway operation is needed to avoid blank profiles.

DR can lead the field team during Seaglider missions. Next deployment the pilot can stay at IMEDEA.

WhatsApp messaging can be used for operational purposes such as indicating the glider is ready, the glider starts to dive, etc.

All ETD members have been exposed to Seagliders.

Improved cradles work and no more changes are planned.

3.2 Piloting and Technical

Ground was detected correctly with sg541 using ALTIM_PULSE,3 and ALTIM_SENSITIVITY,3. However, these values need to be changed to detect the ground earlier (i.e. 60 meters).

sg538 needs a lot of trimming but also does sg541 as it apogees irregularly.

Both gliders sent Argos messages but none could be located. sg538 has not been located when at sea yet.

3.3 Scientific

SBE-25 is taken as the reference instrument.

sg538 and sg541 gave almost exact data (visually checking the plots) at 20 meters depth even if there was 2 hours between the dives of both gliders.

Seagliders measured temperature has approximately the same error as Castaways have.

All seaglider's measures are very accurate. Temperature might be the worst.

Castaways conductivity measures are the worst compared to other parameters it measures.

Instrument	Conductivity (uS/cm)	Temperature (ºC)	Density (kg/m3)	Salinity (PSU)
SBE-25	4,495	13,99	1028,48	37,85
sg538	-	13,95	1028,25	37,90
sg541 (2h before)	-	13,95	1028,25	37,90
SCB-CAST001	4,385	14,05	1027,63	37,76
SCB-CAST004	4,420	14,07	1027,83	37,04

Table 1: Data at 20m depth obtained around Launch point.

Instrument	Conductivity (uS/cm)	Temperature (ºC)	Density (kg/m3)	Salinity (PSU)
SBE-25	1	1	1	1
sg538	-	0,997	1,000	1,001
sg541 (2h before)	-	0,997	1,000	1,001
SCB-CAST001	0,975	1,004	0,999	0,998
SCB-CAST004	0,983	1,006	0,999	0,979

Table 2: Comparison of data on Table 1 taking SBE-25 as reference and rounding up at the 3rd decimal.

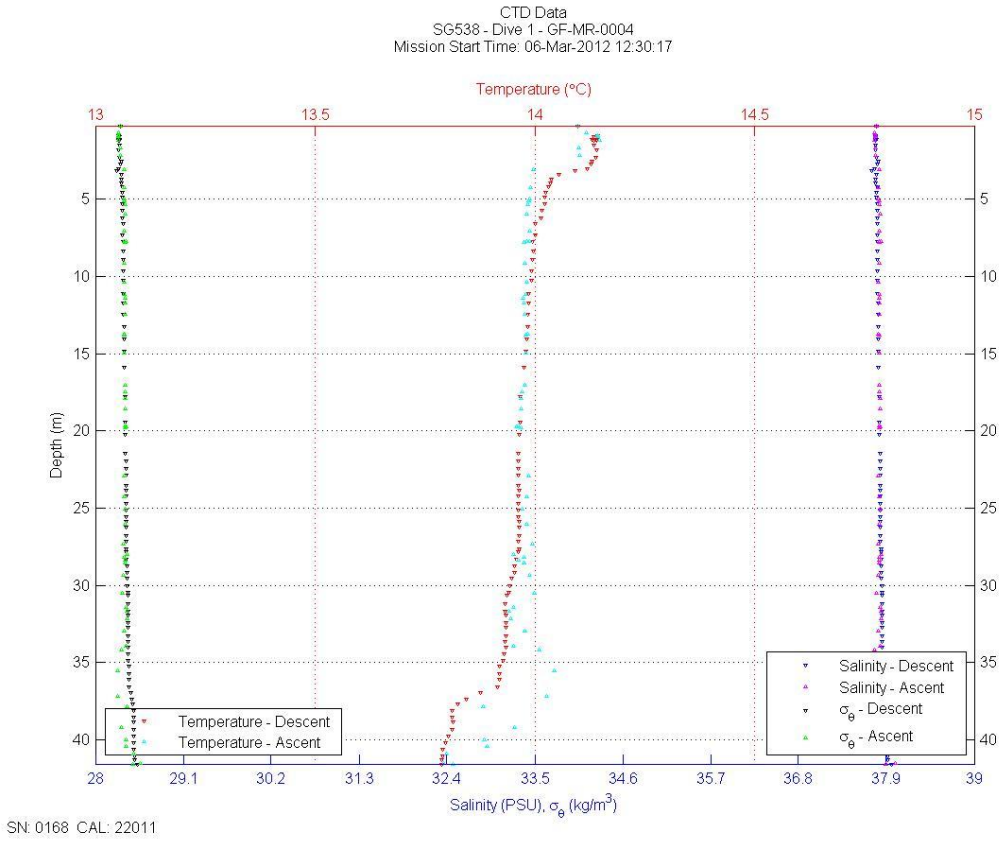

Fig 5: sg538 CTD plot. Taken at 12:30 UTC.

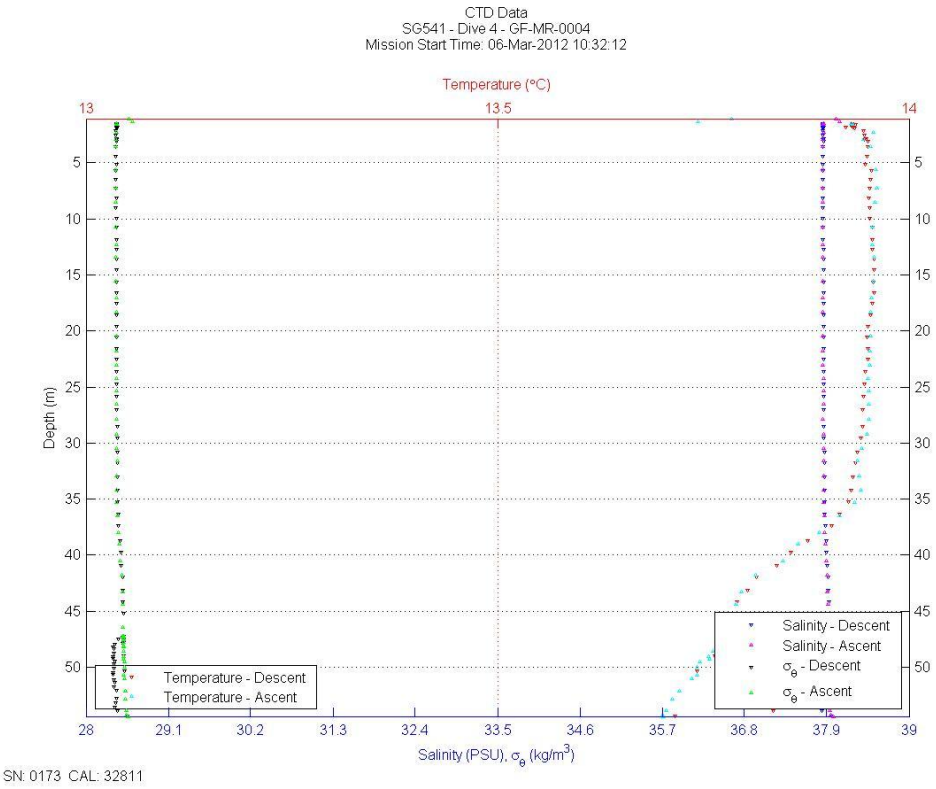

Fig 6: sg541 CTD plot. Taken at 10:32 UTC.

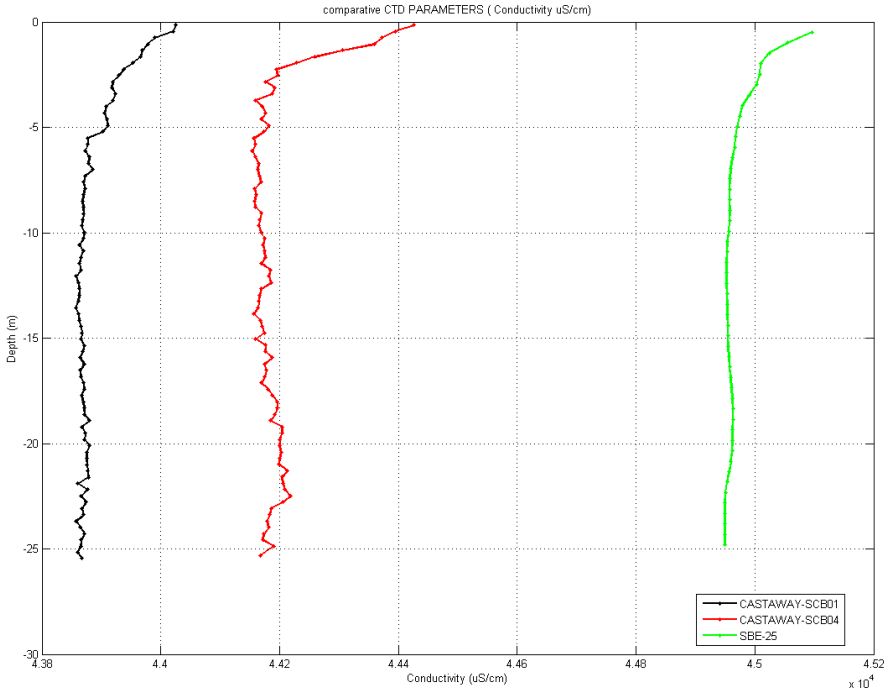

Fig 7: Conductivity plot for SBE-25 (green), SCB-CAST001 (black) and SCB-CAST004(red). Castaways plot is using raw data and SBE-25's used SBE Data Processing.

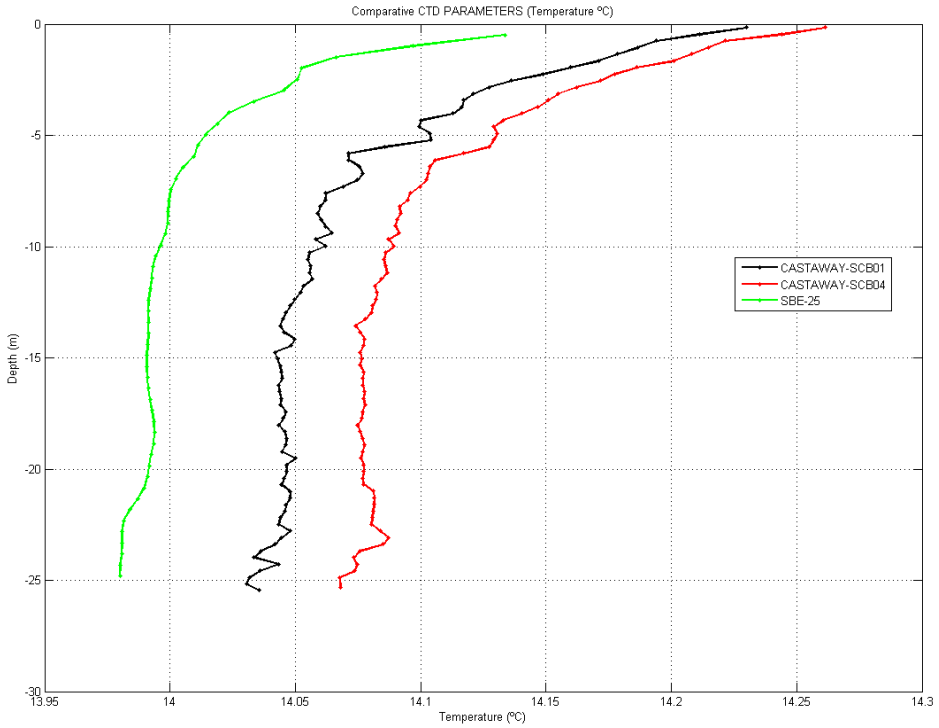

Fig 8: Temperature plot

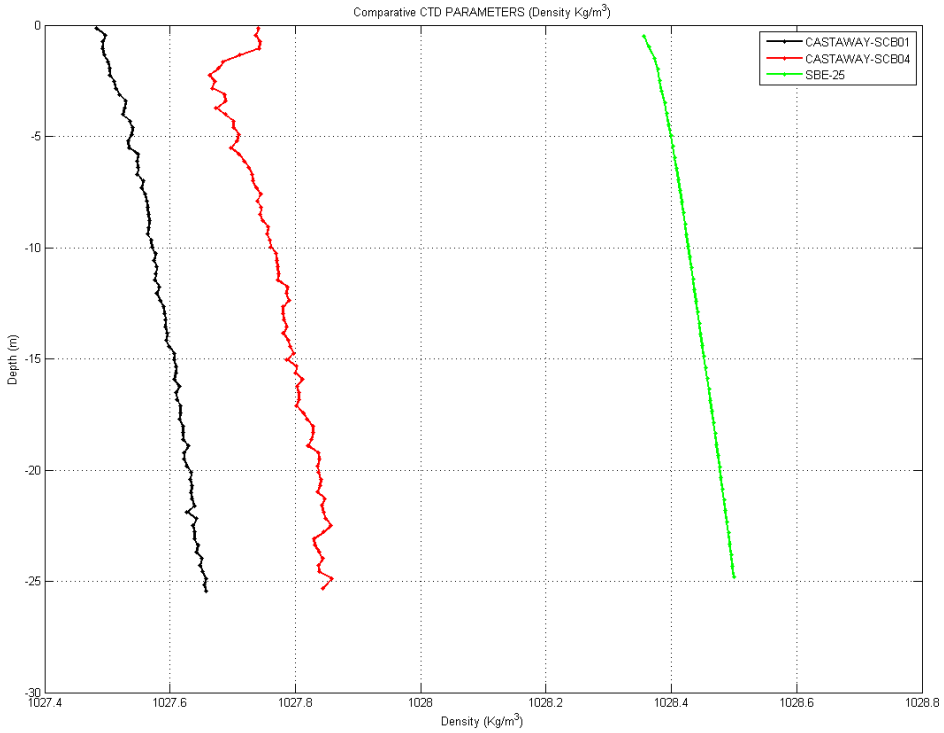

Fig 9: Density plot

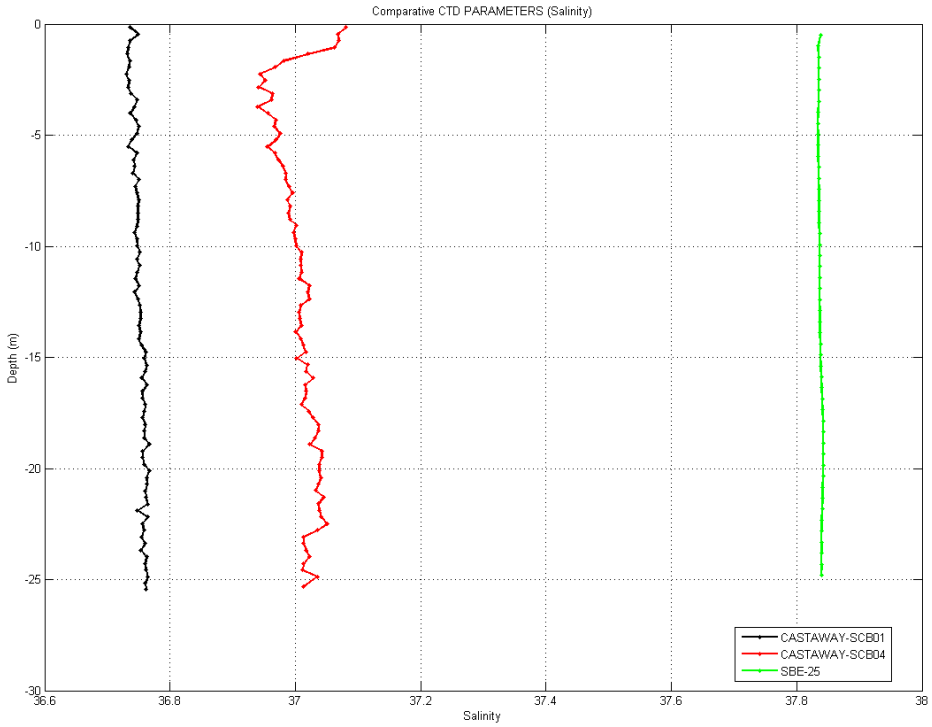

Fig 10: Salinity plot.