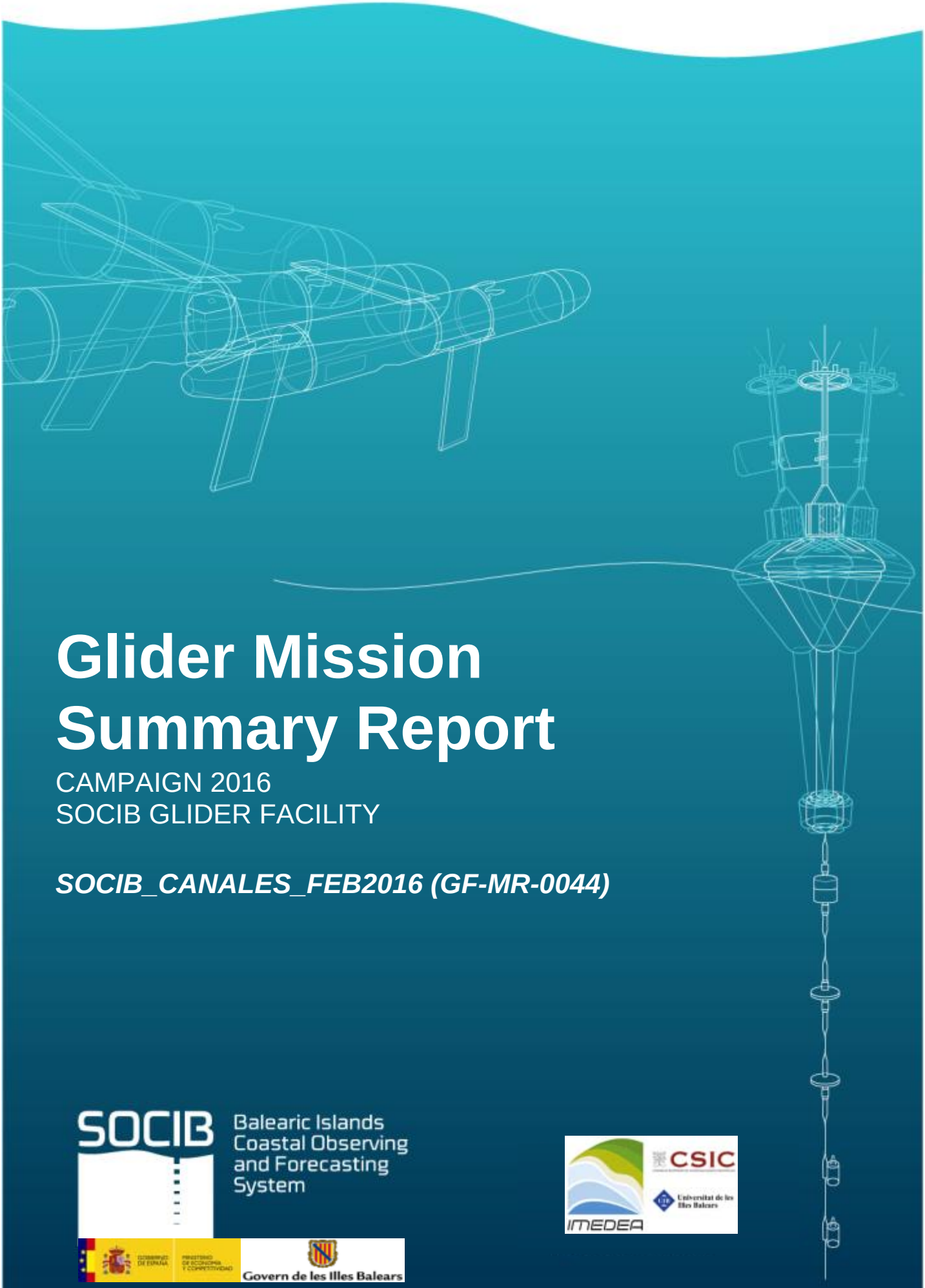

Glider Mission Summary Report

CAMPAIGN 2016
SOCIB GLIDER FACILITY

SOCIB_CANALES_FEB2016 (GF-MR-0044)

SOCIB Balearic Islands Coastal Observing and Forecasting System

Govern de les Illes Balears

IMEDEA CSIC Universitat de les Illes Balears

Mission Name	*SOCIB_CANALES_FEB2016 (GF-MR-0044)*		
Platform Model	*Slocum 1000 G2*		
Platform ID / Name / WMO Code	*U567 / SDEEP04 / 68997*		
Related Platforms / Missions	*SOCIB-R/V (canales winter 2016)* *SCB-APEX006* *SCB-SVP029* *SCB-SVP021*		
Start Date	*2016-02-23*		
End Date	*2016-04-15*		
Total Days	*52*	**Total distance (Km / Nm)**	*1037 / 560*
Survey Area (NODC or SDN region)	*Mallorca and Eïvissa Channels (Western Mediterranean Sea)*		
Objective(s)	• *Establishing the variability of the N/S exchange of water masses that occur through the Ibiza Channel(IC). Sampling standard transects across the Ibiza Channel several times using physical and biogeochemical sensors. No greater than 1 month gap in between consecutive iterations. The Mallorca Channel is also sampled when operationally practical.*		

Scientific Sensors (name & model / serial_number / calibration date)	• *CTD -SBE- / sn 9289 / 27-Feb-2015* • *FLNTU -WetLabs- / sn 3934 / 23-Mar-2015* • *OPTODE -Aandera- / sn 0411 / 01-Feb-2015* *(calibration sheets available upon request to glidertech@socib.es)*
Number of Profiles	*2562 (CTD), 374 (FLNTU), N/A (OXY)*
Significant Events	• *First deployment of sdeep04* • *First deploy with auto open hook from SOCIB R/V* • *Rolled glider due to air bladder position. It produces digifin oddities and file transfer interruptions* • *Recovery using UTC surface and then W50 for waiting* • *Record of consumption of TWR battery (646.7Ah)* • *Very intense currents faced when surrounding Eïvissa (Backwards Navigation)* • *Strong Wind & Waves coincident with the Glider twice during the survey* • *10 Eïvissa-Valencia transects + 1 Eïvissa-Mallorca transect* • *Bad configuration on new oxy4 sensor, no data collected*

Mission Summary

This mission was deployed from SOCIB R/V during Winter 2016 Campaign. It was the very first mission for the glider U567 (SDEEP04).

Preparation phases were executed between 28/Jan/2016 to 09/Feb/2016. All the checks and configurations were undertaken according to the pre-mission-report and applicable protocols. There were neither relevant issues nor problems worth to be mentioned here. Compass error was measured in a EMI-free forest location (max. error = 21,60 deg), loaded with TWR lithium batteries (700Ah).

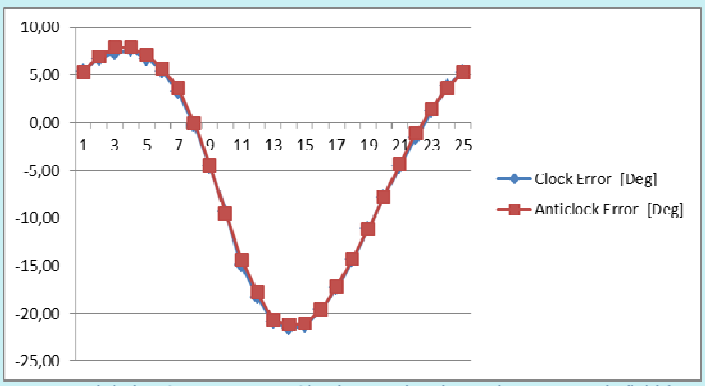

Fig 1.1- Error measured during Compass Error Check procedure in an electromagnetic-field-free environment located in a forest close to IMEDEA (in Esporles)

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Fig 1.2- Special hook for deployment

Launching operation (23/Feb/2016) was executed by 2 ETD and 1 GF facility members on board SOCIB R/V using special hook to deploy it. Glider was released in N38° 59.850' E01° 06.108' at 11:09-utc. The deployment was an operative and tactical success (environmental conditions were very good). Pilot was onshore. Glider executed successful test dives prior to the first survey dive.

During Mission

24/Feb/2016 Strong currents north direction

Fig 1.3. Strong currents

25/Feb/2016 Coincident track with SOCIB R/V

Fig 1.4.

17/Mar/2016 Synoptic platforms: SCB-APEX006, SCB-SVP029 and SCB-SVP021

Fig 1.5

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07/Apr/2016 It was planned another Eivissa channel (242,12Ah), but due to a strong currents at the beginning of the transect (255,53Ah), it was decided return to Mallorca to have enough power for an easy recovery (310,81Ah).

Fig 1.6

During all mission glider reported a lot of digifin oddities and call drops due to rolled glider. This roll was produced by a not centered air bladder position.

Sampling: Science-payload was correctly turned-on and off accordingly to the behavior of the glider executed at all moments during the mission. GPCTD and FLNTU sensors were therefore activated (and configured) consequently by Science-Payload. IMPORTAT: No OXYGEN samples were taken during the entire mission. This Glider unit is the first one ever deployed by SOCIB mounting optode AADI v4; sensor which has a different reference code-word in the Glider's software (with respect to the typical AADI 3835). This was not noticed and the mission configuration tried to turn on 3835 instead of v4, which was the standard and only configuration used by SOCIB gliders since 2011. Consequently, on-board oxygen sensor was never turned on and no oxygen samples taken nor stored. A second mistake, and probably the worse, was not to check that oxygen data was being taken during the execution of the mission. The mission preparation protocols have been modified in order to detect similar situations and to avoid this to happen again.

Recovery operation (15/Apr/2016) was executed by 1 ETD and 1 GF facility members on board SOCIB I. Before operation starts, glider surfaced at 8.00am LT. Then a W50 yo configuration was loaded in "waiting mode", surfacing every 30minuts aprox. Glider was recovered in N39° 21.768' E02° 20.628' at 08:38-utc.

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Principal Investigator (e-mail or contact phone/address)	• *Prof. Joaquim Tintoré jtintore@socib.es (+34 971439821)*
Institute	*SOCIB in collaboration with IMEDEA*
Project Affiliation (web-site)	*http://www.socib.eu*
Partnership / Participation	• *SOCIB* • *IMEDEA (in-kind contribution of infrastructures)*
Glider Software Version	*Nav : v7.18 Acomms, Payload: 3.21*
Data Retrieval (real-time [RT] / delayed-mode [DM])	• *RT: sub-set via satellite link every 6 hours every day.* • *DM: direct download of full gathered data sets (flash-cards backup)*
Compass Calibration (specify procedure)	*Compass error was measured. Observed error suggests re-calibration is needed. Deviation in Navigation is considered a consequence of strong currents though (See Figure 1.1)*
Battery Type	*TWR lithium batteries (702Ah-nominal capacity)*
Battery Consumption (Ah)	*310,76Ah (reading from 336,02 to 646,78Ah)*
Data Available From	*http://thredds.socib.es/thredds/catalog/auv/glider/sdeep04-scb_sldeep004/catalog.html*
Further Details	*glidertech@socib.es*

Figure 1

(Map providing general overview of Survey Area)

On-line Track

http://apps.socib.es/dapp/?deployments=585-52-0-990033&layers=ocean_basemap&units=scientific

Figure 2

(Map providing detailed overview of Survey Area and traced Flight Path with surface points if possible)

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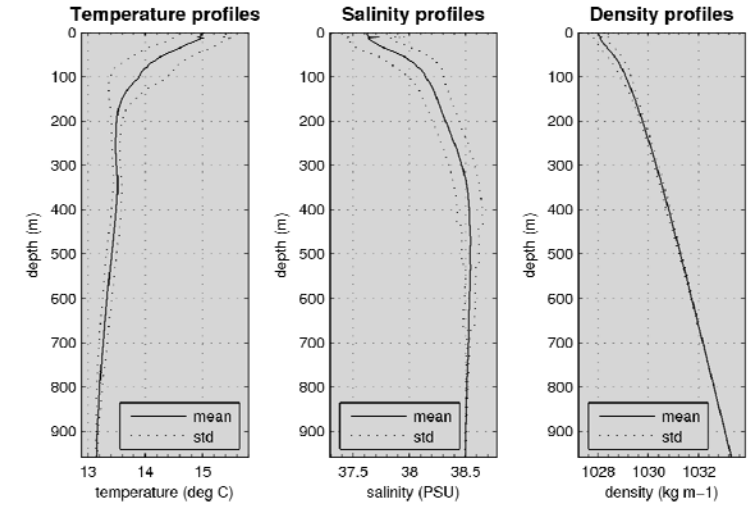
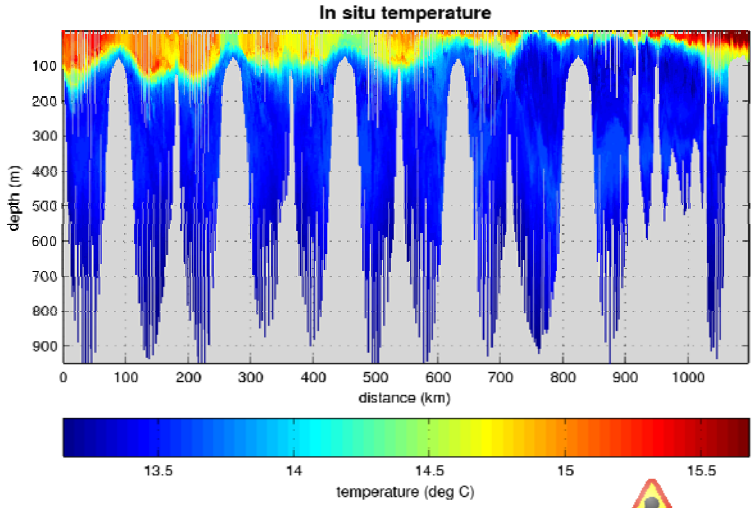
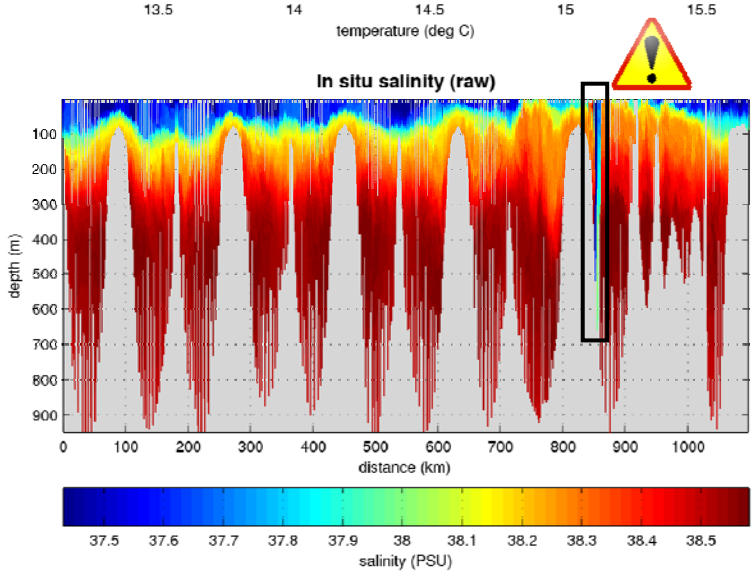
Scientific Preliminary Review

(Compilation of preliminary post-processing plots provided by SOCIB's data-center glider-toolbox and processing services. Contact data.center@socib.es for further info. Plots available through DAPP - See Figure 1 -. Comments provided by SOCIB's scientific staff)

CTD







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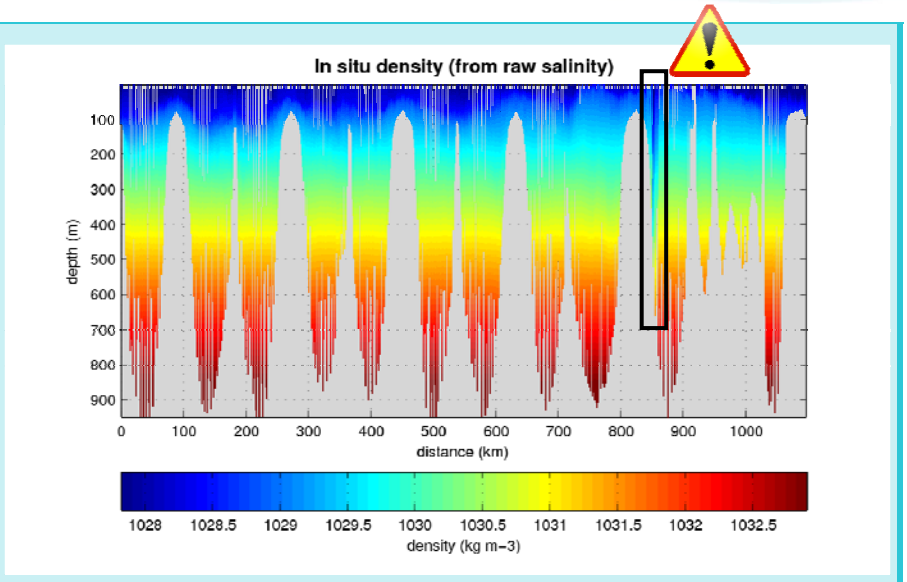

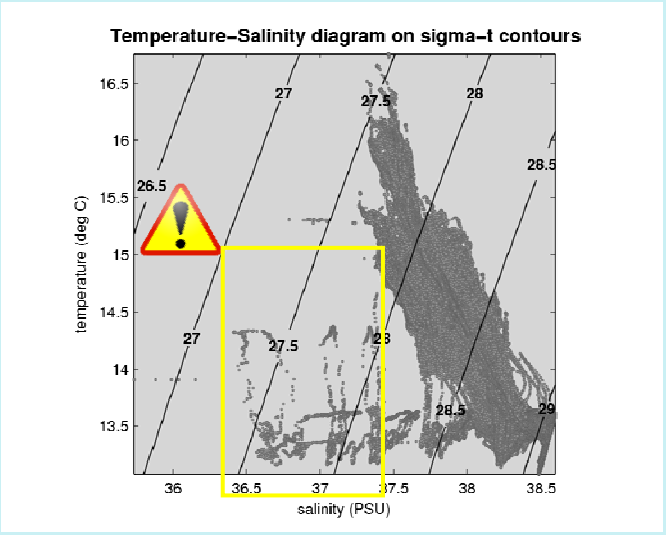

As can be seen in the salinity section and in the T/S diagram, there appears to have been a problem with the CTD unit at the start of transect 10 of the Ibiza Channel (2nd-April-2016). The problem appears to have affected the conductivity sensor (see plots below) and is most likely result of some debris/bio fouling of the tube or sensor itself. Starting around 10:00 the conductivity values drop dramatically and then gradually recover and by 21:00pm the measurements appear to have returned to "normal" values, indicating that the suspected debris was flushed from the system.

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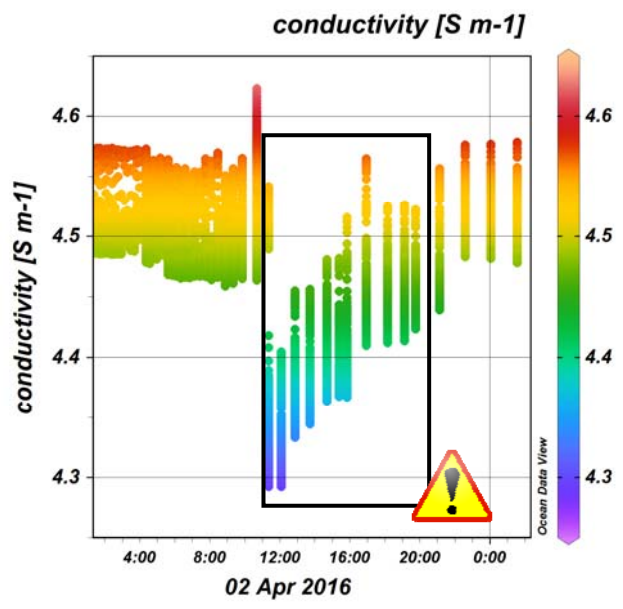

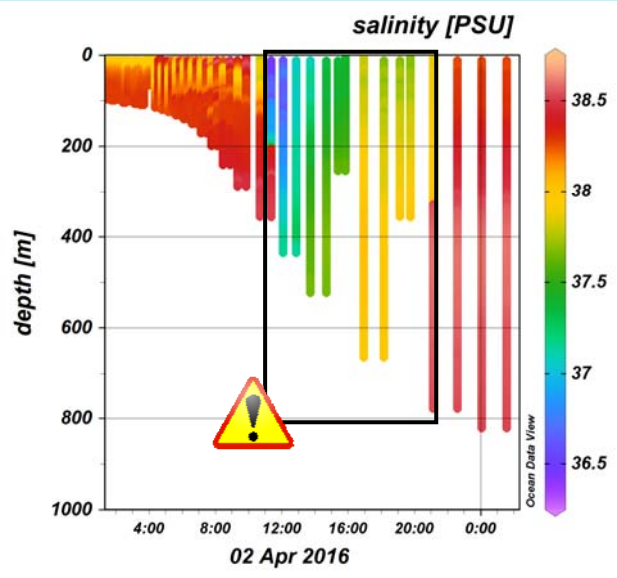

The T/S plot suggests that some of the data may be recoverable and this will be investigated during the delayed mode (DM) processing of the data. In the meantime although a bio-fouling event is suspected a short malfunctioning of the pump cannot be discarded and so the GPCTD unit will be closely checked before the next deployment.

This issue is however relatively minor within the whole mission and the general results look extremely interesting.

There appears to be a relatively rapid change in the thermocline (and halocline) starting in transect 7 of the Ibiza Channel and continuing through to transect 9. Fresher Atlantic Water of more recent Atlantic Origin (AWr), with S > 37.5 is visible at the surface across the Ibiza Channel in the initial 8 transects above the thermocline. Coincident with the shallowing of the thermocline in transect 9 this AWr appears to be concentrated in the west of the channel and then not strongly present in transect 10. It is again present in the subsequent sampling of the Mallorca Channel as the glider returns to Mallorca. Patches of cold (approx. 13 deg. C) water mass can be seen transects 8, 9 and 10. This is likely to be the sub surface temperature minimum Winter Intermediate Water (WIW) seen in the T/S diagram.

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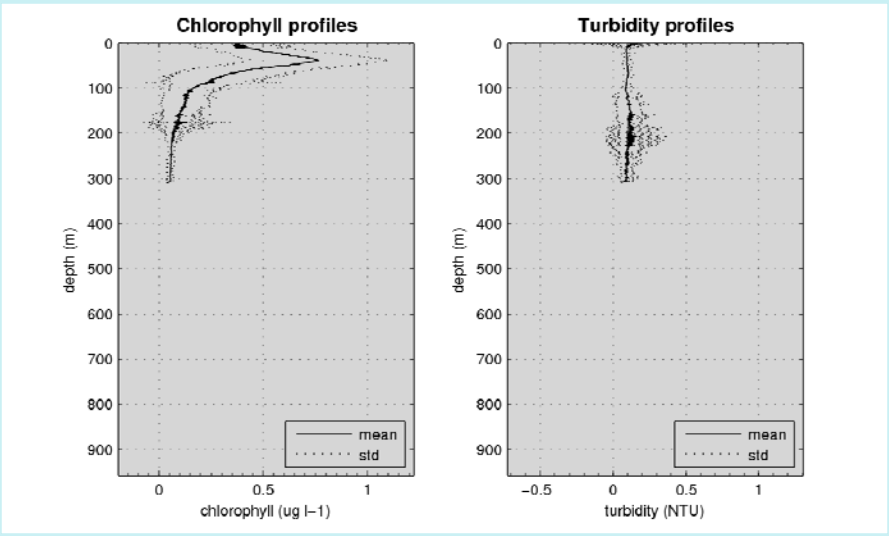
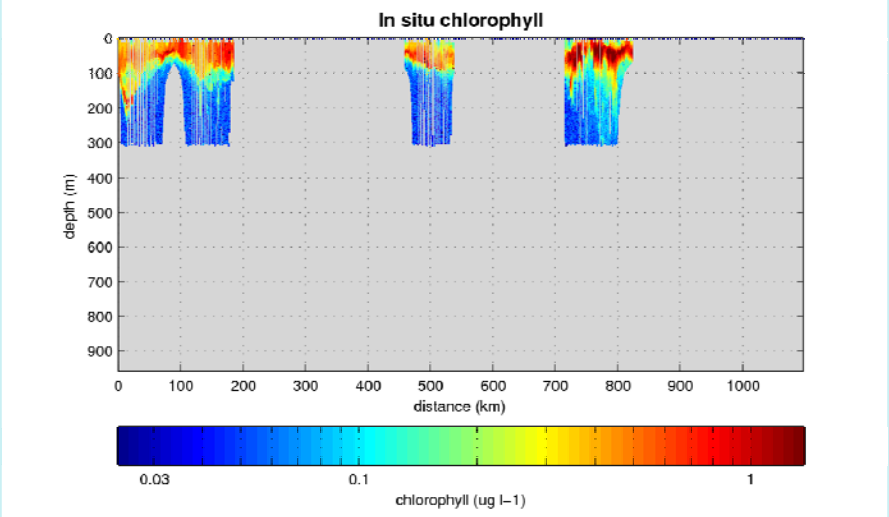
A detailed look at the data in post mission processing will identify how these observations are linked, although a strengthening of the Northern Current perhaps associated with the influx of 2016 WIW could be a likely scenario.

OXYGEN

NO OXYGEN DATA (see the 'Sampling' comments in 'Mission Summary' section above)

TURBIDITY & CHLOROPHYLL





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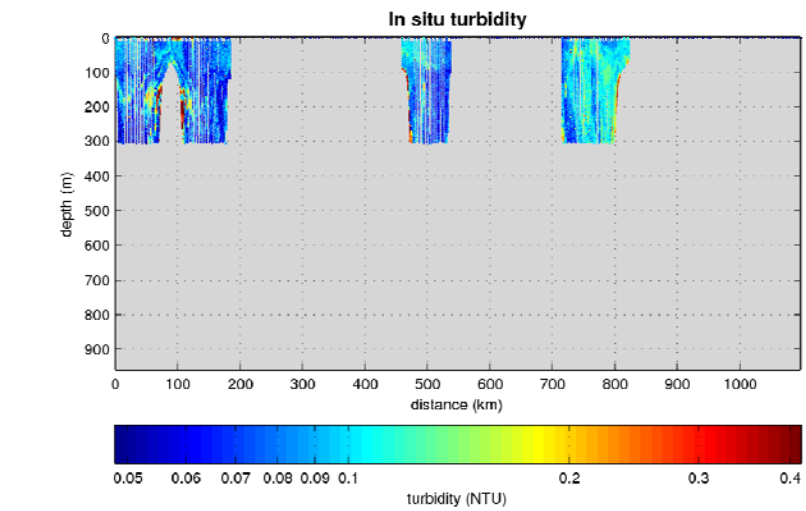
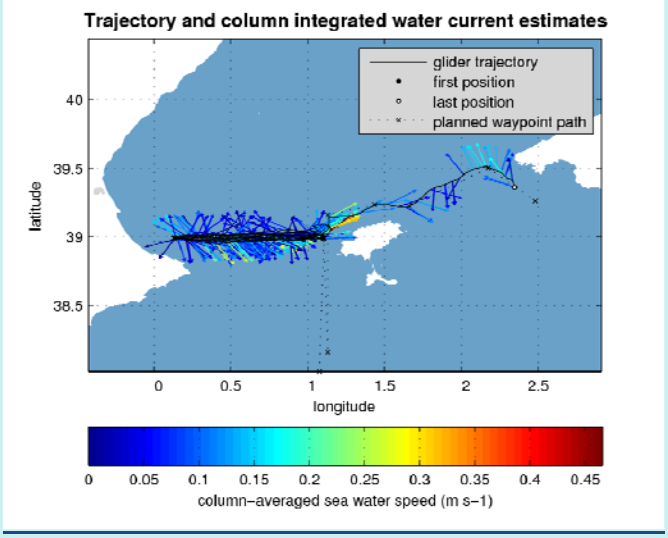


The chlorophyll signature appears to change between the initial part of the mission and the end, at the start it is generally higher above the thermocline in the mixed layer, towards the end of the mission (700 - 800 km) it appears higher and concentrated in a subsurface band (30 – 100 m approx. in the channel and higher on the shelf). The turbidity signal has also changed between that start of the mission and the 800 km sampling, low at the start with patches of high turbidity at sub surface (200 m) at the western edge of the Ibiza Channel and with a sub surface maxima indicated below the thermocline. Then at the 700 - 800 km sampling more ubiquitous through the water column to 300 m, with again a subsurface maximum at the western channel edge (200 m).

These again reflect some shift in the Ibiza Channel dynamics around transects 8, 9 10.



CURRENTS

The signal from the uncorrected DAV indicates both northward and southward flows in the Ibiza Channel. It is not possible from this plot however to determine the evolution through the mission. It might be expected, from the distribution of the water masses, that flows would have a northward across channel component in the earlier transects, with stronger southward flow in the west of the channel in later transects.

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