



Glider Mission Summary Report

CANALES NOV 2017
SOCIB GLIDING NOV2017 (GF-MR-0065)



Balearic Islands
Coastal Observing
and Forecasting
System



Mission Name		20171019_GF-MR-0065_SOCIB-ENL-CANALES-NOV2017_sdeep05	
Platform Model		Slocum 1000m G2	
Platform ID / Name / WMO Code		U568 / sdeep05 / 68998	
Related Platforms / Missions		None	
Start Date		2017-11-16 12:30:06 UTC	
End Date		2017-12-08 10:46:40 UTC	
Total Days	21.9	Total distance (Km / Nm)	465 / 251
Survey Area (NODC or SDN region)		Mallorca and Eivissa Channels (Western Mediterranean Sea)	
Objective(s)	<ul style="list-style-type: none">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.		
Number of Profiles	CTD: 652 casts of 1347 half-Yos. Overall sampled vertical distance [m]: 105931.0 FLU: 378 casts of 1347 half-Yos. Overall sampled vertical distance [m]: 39772.0 OXY: 378 casts of 1347 half-Yos. Overall sampled vertical distance [m]: 51737.0		
(name & model / serial_number / calibration date)	<ul style="list-style-type: none">CTD -SBE- / sn 9290 / 23-Feb-2015FLNTU -WetLabs- / sn 3935 / 19-Mar-2015OPTODE -Aandera- / sn 0402 / 25-Jan-2015 (calibration sheets available upon request to glidertech@socib.es)		
Significant Events	<ul style="list-style-type: none">Deplofyment from St. Antorni (Eivissa) using Conselleria boatDigifin abort on 30 Nov 2017Digifin abort on 02 Dec 2017Emergency recorver on 08 Dec 2017		
Mission Summary	<p><u>Pre-mission Report</u> Created prior to the beginning of preparations. It compiles key preliminary aspects of GF-MR-0065 derived from pre-mission planning sessions.</p> <p><u>Preparation</u> Phases were executed between 19/Oct/2017 to 12/Nov/2017. All 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.</p> <p><u>Launching</u> This field operation (16/Nov/2017) was performed by 2 G-F and Rall (Conselleria Eivissa property) at the south of Eivissa island (Es Vedrá).</p> <p>Additionally, glider pilot was remotely acting from IMEDEA. These two teams were in permanent contact by GSM-phones and messaging applications (when possible).</p> <p>The deployment was an operative and tactical success. Glider executed successful test dives prior to the initial survey dive (regardless the extraordinary elements, the launching protocol was strictly fulfilled).</p>		

Survey

In general terms, it was very successful, until digifin abort.

- **Navigation:** it was very satisfactory. The glider responded well to the commanded target waypoints.
- **Underwater Maneuvering:** two main configuration was applied during the deployment: optical sensors on and optical sensors off.
- **Engineering**
 - Power Source: (Lithium Eltec battery pack). Dummy Pitch battery. It performed very well.
 - Electro-Mechanical: actuators and sensors exhibited an acceptable performance. Besides normal Oddities raised by Digifin, numerous. This 'out of deadband' are due to the imprecision of the micro-positioning of the pump which is probably a cause of fatigue and age of the device. Device Error-Statistics:

Sensor	Oditties	Warnings	Errors
GPS	0	5	0
attitude_rev	0	2	0
pitch_motor	2	0	0
science_super	47	1	0
digifin	448	1011	13
IRIDIUM	173	3	0
DE_PUMP	11	0	0

Chart 1 Summary of Underwater Strategies (Navigation)

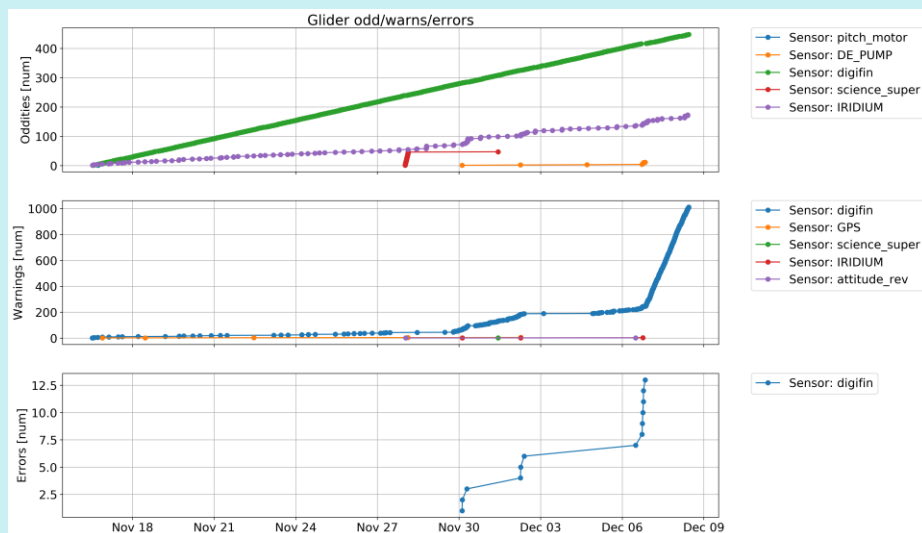


Figure 1- Glider oddities, warnings and errors

- Communication Systems: were reliable and fluent.
- Electronic Modules: (processors, memory cards, control boards,...) revealed no evidences of problems but the mentioned "Ring Buffer Overflow" problem occurred in Science-Super.
- Contextual/Awareness Sensors: pressure transducer, internal vacuum and internal temperature seemed to have worked correctly. Compass also reported coherent values. Altimeter detected the bottom correctly.
- Hull/Hydrodynamics: no signs of problems.

Recovery

In this case (emergency recover), a new behaviour was loaded in order to simplify recovery operation. 1 GF flew to Valencia in order to save time, rented a boat and recover the glider. The glider stayed in Denia's harbor until another GF went by boat.

HHRR

Once more, the novelties and exigencies of this mission required of an extraordinary team coordination (with more people involved and number of intra-communications). Nevertheless, coordination amongst multiple participants (glider-techs, field-techs, scientists & outreachers) was fluent and efficient. There were no personal damages and the availability of each member, for all the tasks assigned at each moment, was correct (including on-alert shifts for field intervention and 24/7 glider monitoring during survey -which was more intense than usual-). Interaction with external partners was also very fruitful.

Detailed Charts:

Date (utc)	16/nov	6/dec
Underwater Top Inflection Depth (m)	10	
Underwater Bottom Inflection Depth (m)	950	
Minimum Distance to Sea-floor to be kept (m)	40	
Surface upon completion of this # of dives	∞	
Surface if this amount of hours without stable communications (hrs)	12	
Surface at this particular UTC times	4,12,20	
Surface if a waypoint is hit within that distance (m)	1000	
Optics	OFF	ON

Chart 2 Summary of Underwater Strategies (Navigation)

Date (utc)	SEN	fSMP	DRNG	MDIV	MCLI
(from Mission Start to Mission End)	CTD	0,5000	[-5, 2000]	yes	yes
	OXY	0,5000	[-5, 2000]	yes	yes
	FLNTU	0,5000	[-5, 250]	yes	yes
SEN: Sensor type					
fSMP: Frequency of sampling (Hz)					
DRNG: Depth range this configuration applies (m)					
MDIV: Sampling during Diving maneuver					
MCLI: Sampling during Climbing maneuver					

Chart 3 Summary of Commanded Sampling Strategies

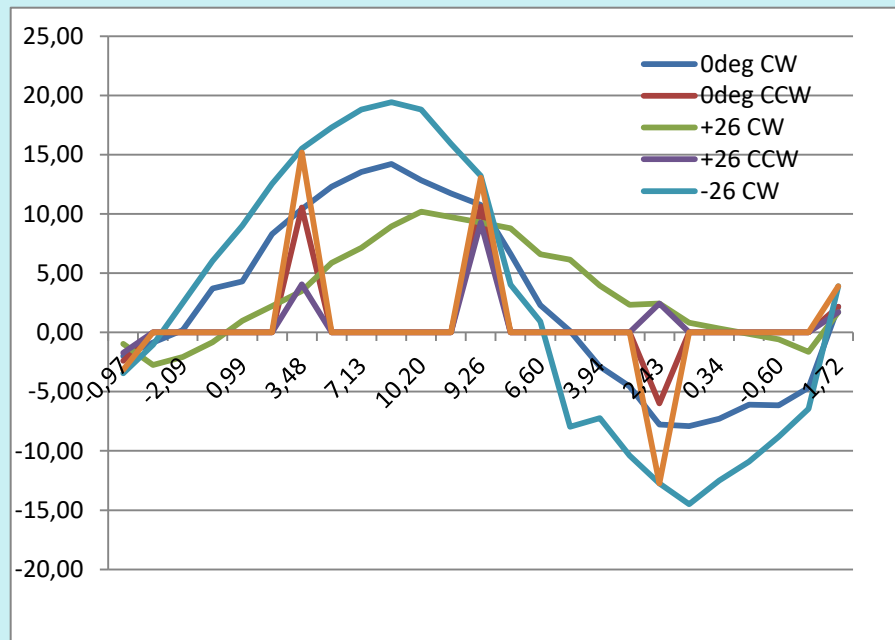


Figure 2-Error measured during Compass Error Check procedure in an electromagnetic-field-free environment located in a forest close to IMEDEA (in Esporles)

Principal Investigator (e-mail or contact phone/address)	<ul style="list-style-type: none"> Prof. Joaquim Tintoré jtintore@socib.es (+34 971439821)
Institute	SOCIB in collaboration with IMEDEA
Project Affiliation (web-site)	http://www.socib.eu
Partnership / Participation	<ul style="list-style-type: none"> SOCIB IMEDEA (in-kind contribution of infrastructures)
Glider Software Version	Nav : v7.14 Acomms, Payload: 3.18
Data Retrieval (real-time [RT] / delayed-mode [DM])	<ul style="list-style-type: none"> RT: sub-set via satellite link at each surface maneuver DM: full/direct memory card backup after glider disassembly during Conclusion mission-phase
Compass Calibration (specify procedure)	Compass error was measured. Observed error followed a well-known sinusoid-shape although the glider followed traced-route very well(See Figure 2). Re-calibration is needed.
Battery Type	Eltec lithium Battery Pack (300Ah-nominal capacity) (Brand new)
Battery Consumption (Ah)	117Ah (reading from 4Ah to 121Ah)
Data Available From	http://thredds.socib.es/thredds/catalog/auv/glider/sdeep05-scb_sldeep005/L0/2017/catalog.htm
Further Details	glidertech@socib.es

General Map

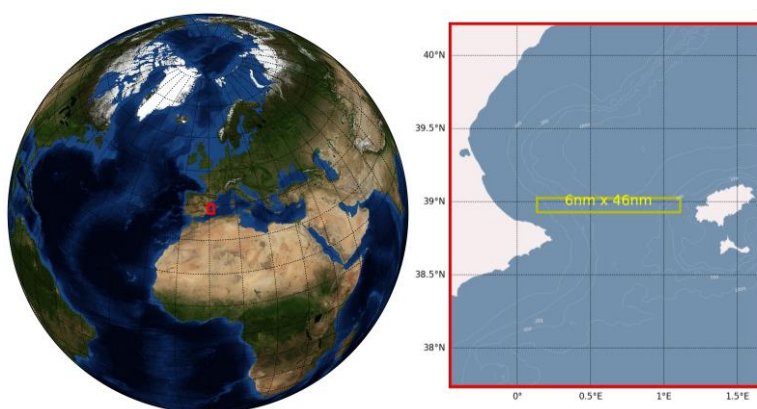


Figure 3 - Map providing general overview of the Survey Area

On-line
Track

<http://apps.socib.es/dapp/?deployments=775-23-0-FF66CC&layers=none&units=scientific>

Detailed Maps

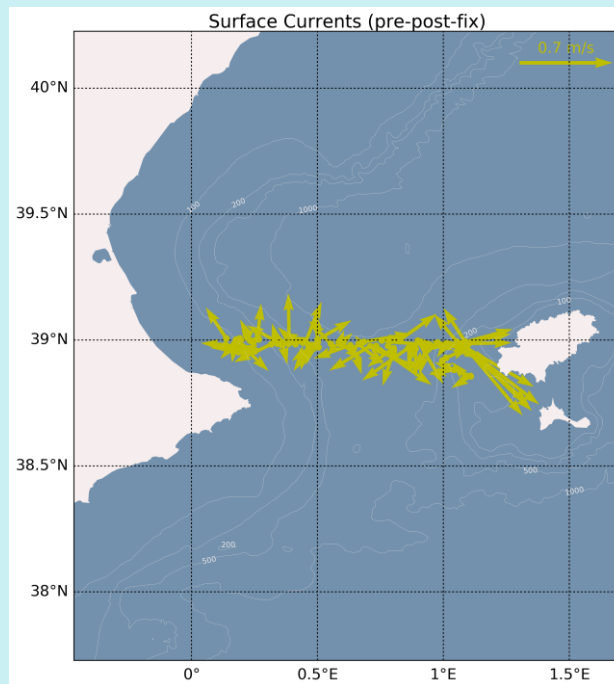


Figure 4 – Surface currents (pre-post fix)

Scientific
Preliminary
Review

CTD

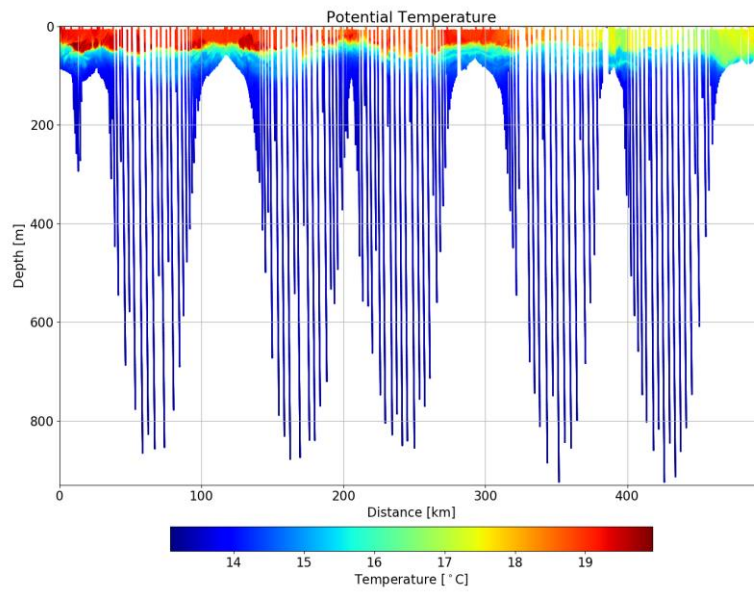


Figure 5 - Potential temperature (full depth range)

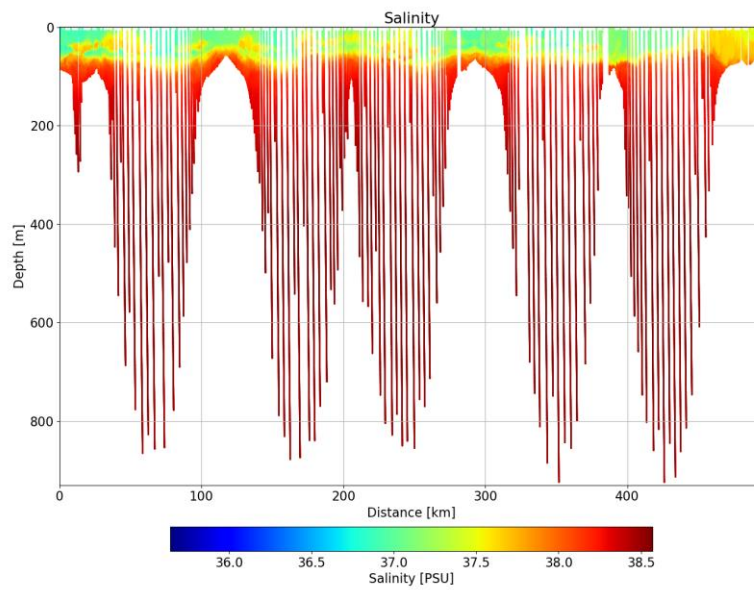


Figure 6 - Corrected salinity (full depth range)

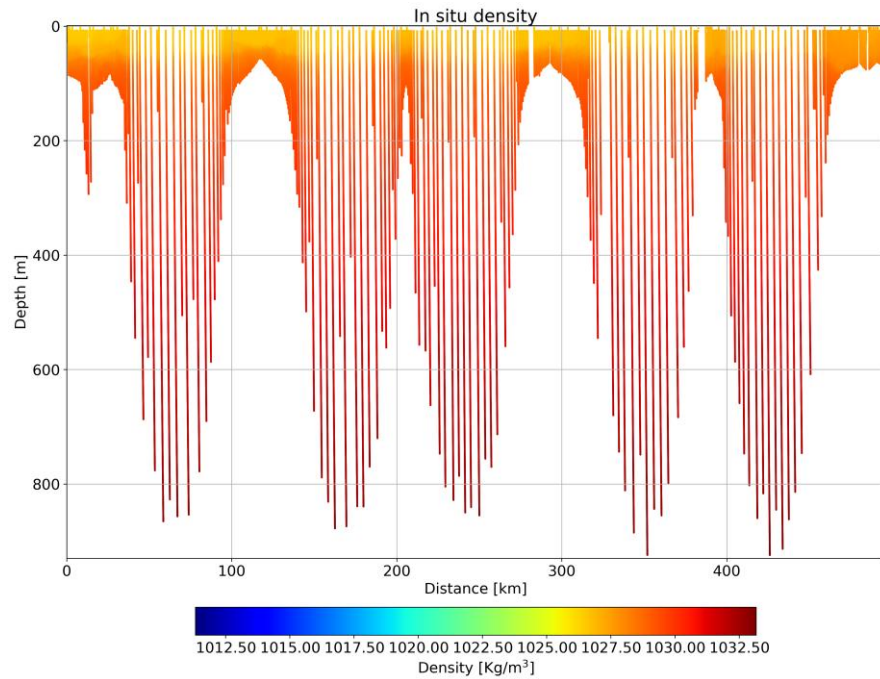
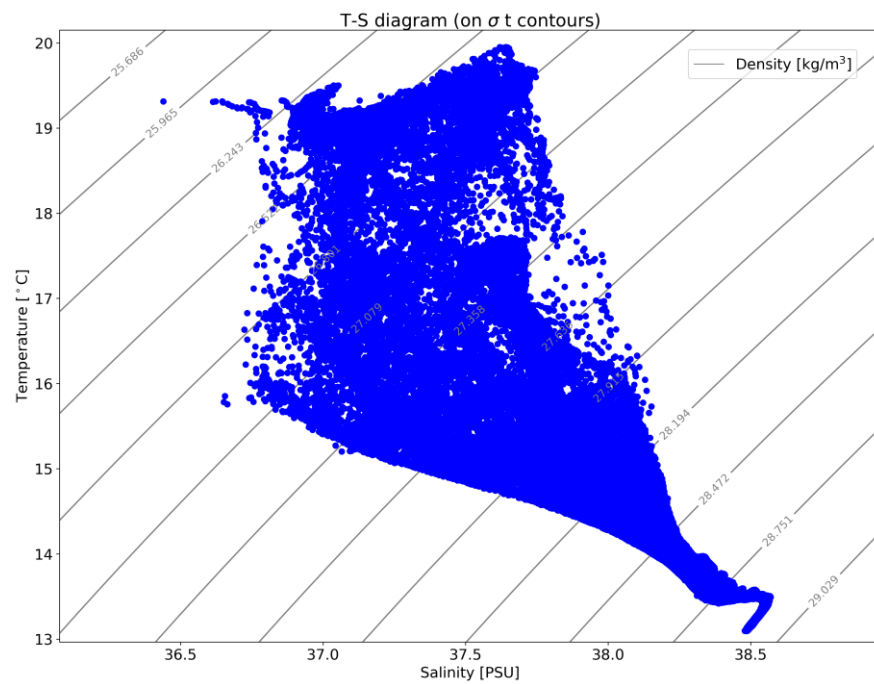
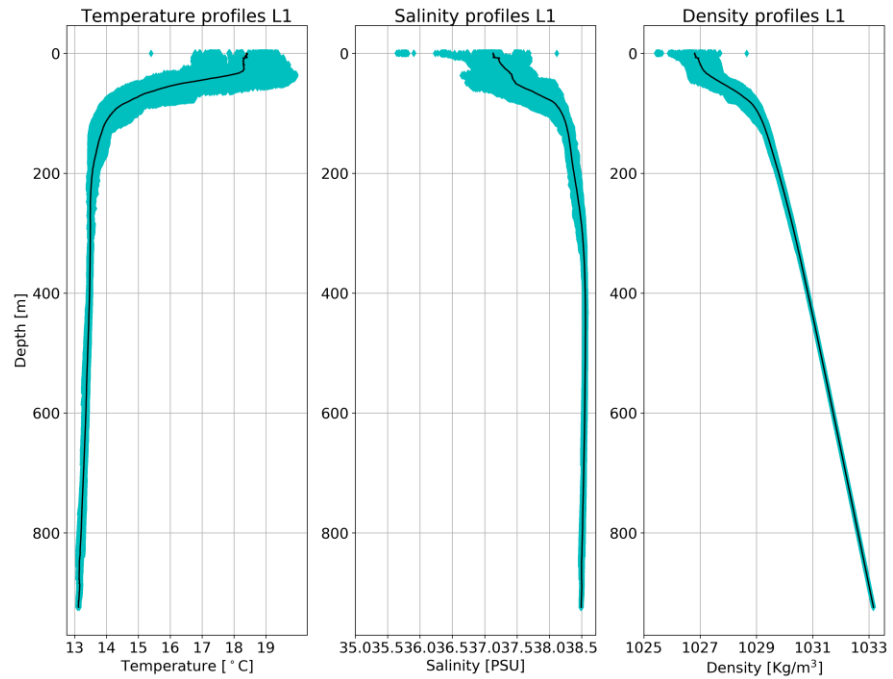


Figure 7 – In-situ Density derived from corrected salinity and temperature (full depth range)



Plot 4 – T-S diagram (thermal-lag corrected)



Plot 4 – CTD profiles

OXYGEN

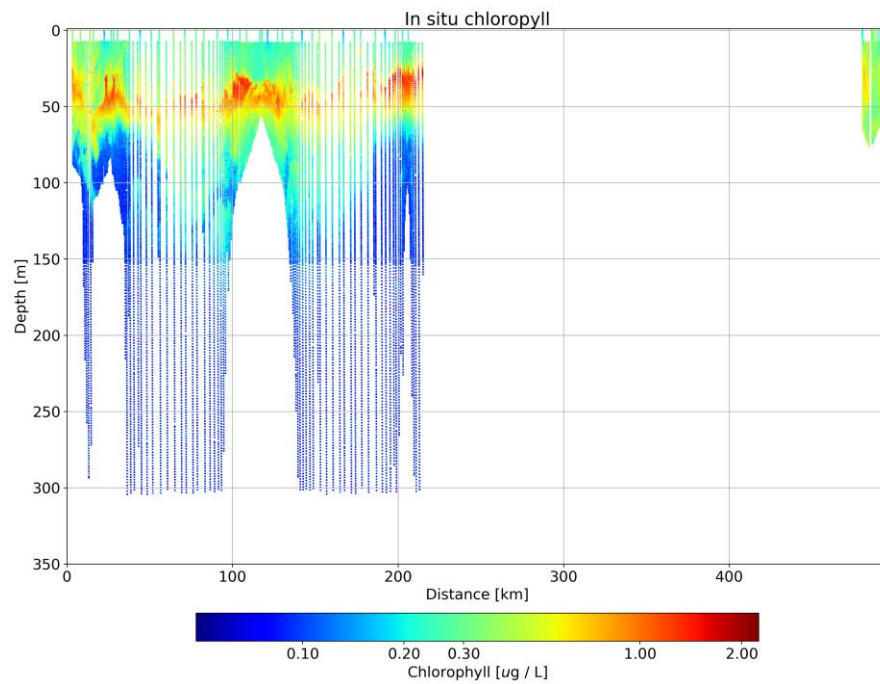


Figure 8 - In-situ oxygen concentration

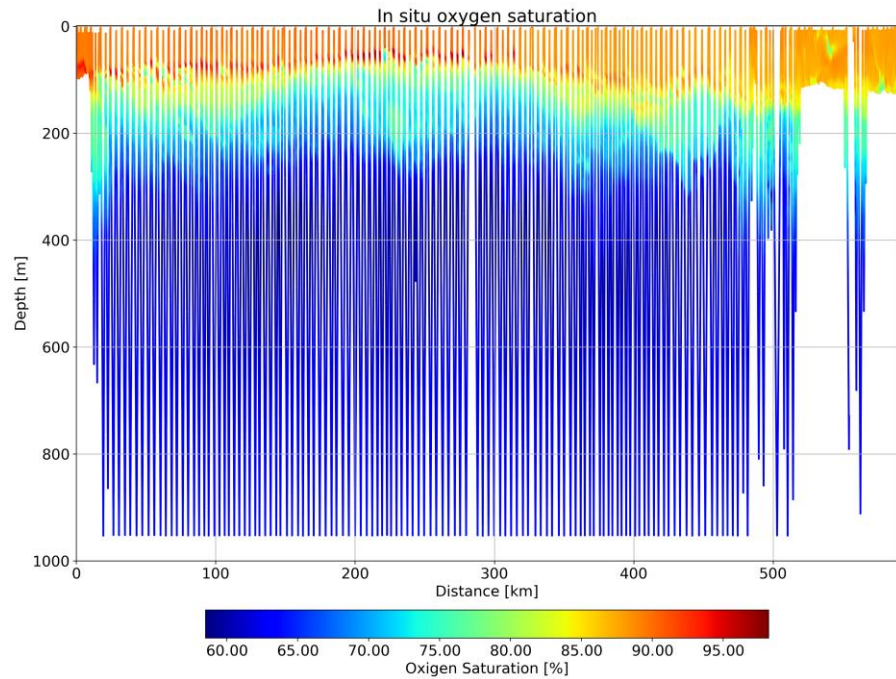


Figure 9 - In-situ oxygen saturation

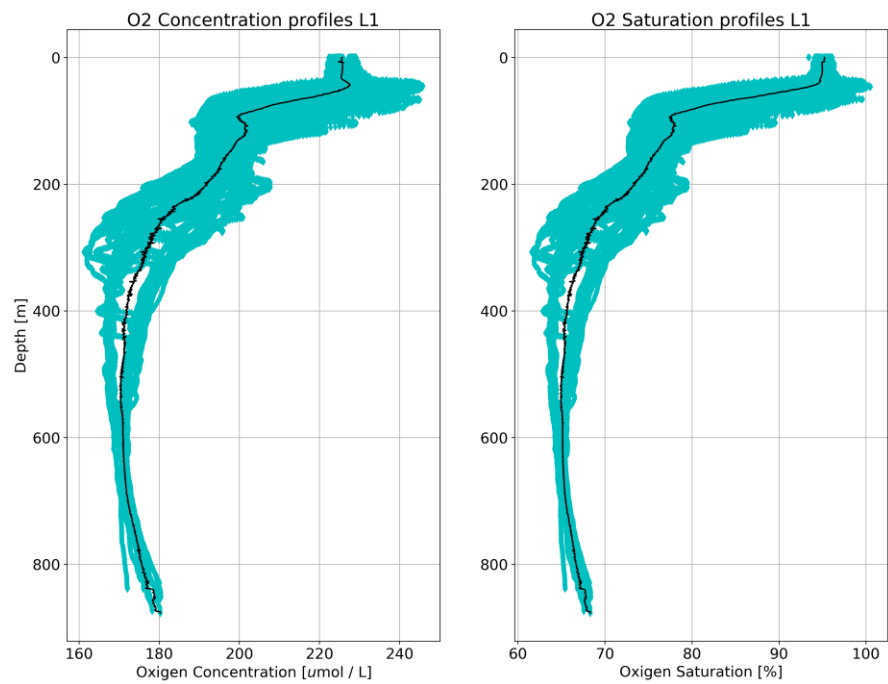


Figure 10 – Oxygen profiles

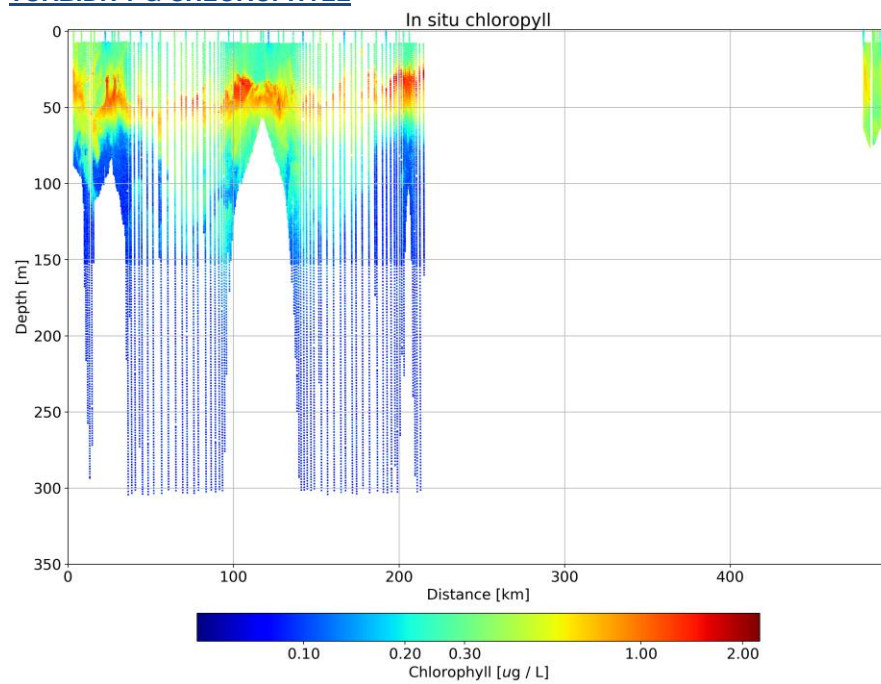
TURBIDITY & CHLOROPHYLL

Figure 11 – In situ chlorophyll

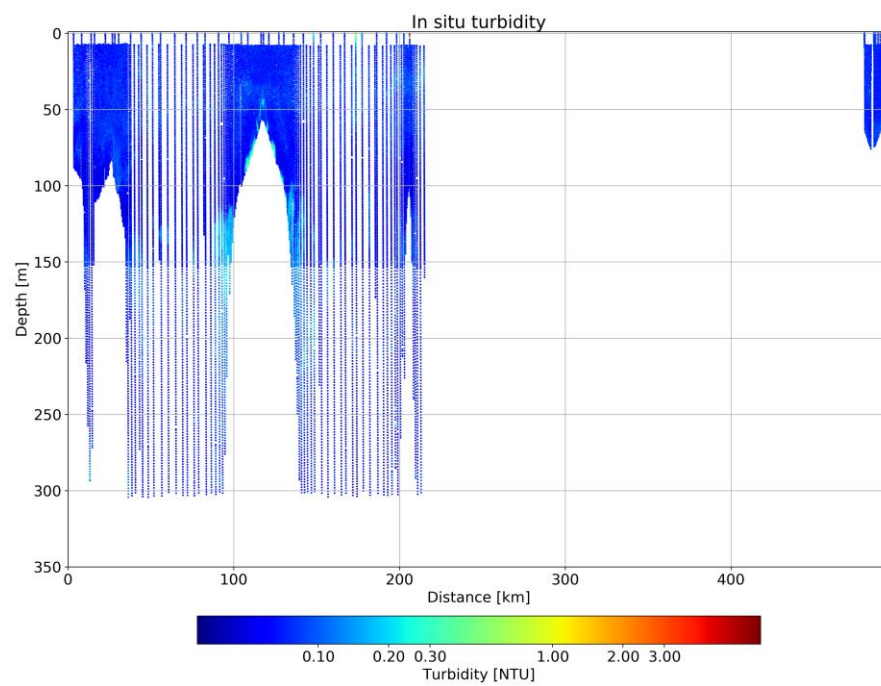
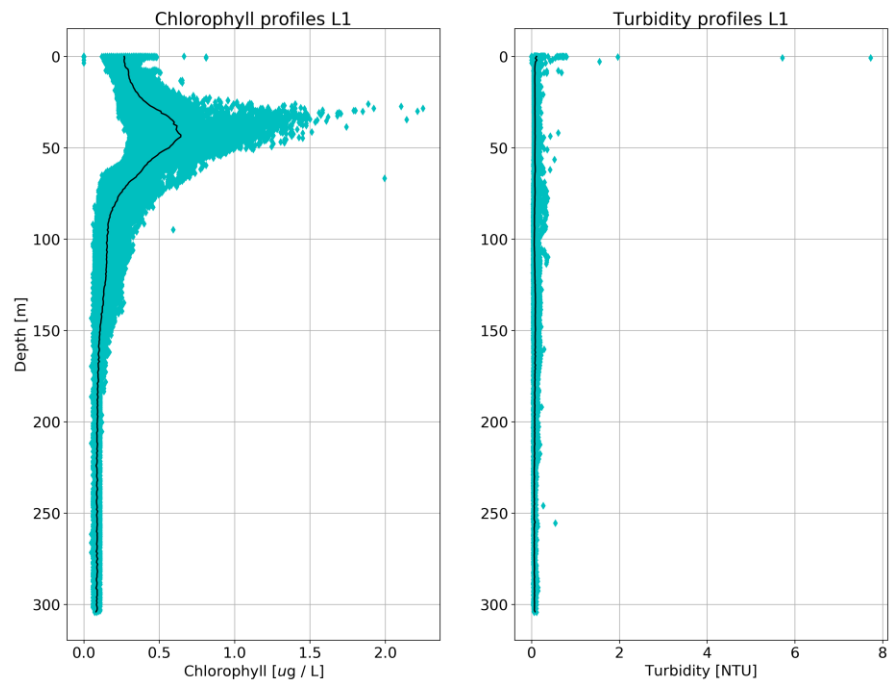


Figure 12 – In situ turbidity

*Figure 13 – FLNTU profiles*