



Glider Mission Summary Report

PARTHENOPE ABACUS4 PART 2
SOCIB GLIDING MAY2018 (GF-MR-0078)



Balearic Islands
Coastal Observing
and Forecasting
System



Mission Name		20180515_GF-MR-0078_SOCIB-EPR-ABACUS4-MAY2018_sdeep00	
Platform Model		Slocum 1000m G2	
Platform ID / Name / WMO Code		U243 / sdeep00 / 68457	
Related Platforms / Missions		Sentinel3	
Start Date		2018-05-15 09:18:49 UTC	
End Date		2018-06-07 07:54:08 UTC	
Total Days	22.9	Total distance (Km / Nm)	291.3 / 175.3
Survey Area (NODC or SDN region)		Algerian-Basin (AB) region in between South-Mallorca-Coast and North-Algerian-Coast [Western Mediterranean Sea]	
Objective(s)	<ul style="list-style-type: none">• To continue the time series of oceanographic data collected in the Algerian Basin along the endurance line between Mallorca and Algeria;• To identify the physical and biological properties of the surface and intermediate water masses between Balearic Islands and Algerian Coast;• To intercept any mesoscale eddy identified during the mission;• To understand the sub-basins dynamics and the complex interactions due to eddies;• To assess the ocean description capabilities of several satellite products when approaching coastal areas, also comparing them to glider high resolution in situ data;• To validate the new along-track (L3) and gridded interpolated maps (L4) altimetry products provided by the Sentinel-3 altimetry mission and the other satellites for the western Mediterranean Sea.		
Number of Profiles (name & model / serial_number / calibration date)	<p>CTD: 501 casts of 502 half-Yos. 559576 samples. Overall sampled vertical distance [m]: 267046.0 FLU: 501 casts of 502 half-Yos. 79203 samples. Overall sampled vertical distance [m]: 110344.0 OXY: 501 casts of 502 half-Yos. 311628 samples. Overall sampled vertical distance [m]: 267046.0</p> <ul style="list-style-type: none">• CTD -SBE- / sn 0064 / 05/dic/2016• FLNTU -WetLabs- / sn 3711/ 16/dic/2016• OPTODE -Aandera- / sn 1409/ 14/feb/2017 <p>(calibration sheets available upon request to glidertech@socib.es)</p>		
Significant Events	<ul style="list-style-type: none">• 29 may sentinel overpass		
Mission Summary	<p><u>Pre-mission Report</u> Created prior to the beginning of preparations</p> <p><u>Preparation</u> There was no preparation because it was a concatenation to a previous mission (pre-SWOT GFMR0075). No launching operation.</p> <p><u>Launching</u> No physical launching operation.</p> <p><u>Survey</u></p>		

In general terms, it was very successful.

- **Navigation:** it was very satisfactory. The glider responded well to the commanded target waypoints.
- **Underwater Maneuvering:** two main configuration was applied during the deployment: deep flying mode during the operative part of the mission in order to reduce consumption; and adaptive flying mode in the rest of the mission in order to avoid collisions with seabed.
- **Engineering**
 - Power Source: (Lithium Teledyne battery pack). 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:
 - 1 Errors (attitude_rev) ;
 - 5 Warnings (GPS)
 - 473 Oddities digifin, 139 Oddities iridium).
 - Communication Systems: were reliable and fluent.
 - Electronic Modules: Fluent.
 - 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.
 - Mission Runs: 1 mission run. No significant event

Recovery

In this case, a new behavior was loaded in order to simplify recovery operation.

Administration/Notification

Although multiple administrative and notification procedures took place during the different stages described above, these have not been reported because are considered out of the scope of this report. Same applies for multimedia and public-diffusion (special and more intense actions taken in that aspect. Contact gliderteh@socib.es and outreach@socib.es for specific information); and also for accounting.

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	15/may	16/nov	23/may	02/jun	03/may
Underwater Top Inflection Depth (m)	15				
Underwater Bottom Inflection Depth (m)	950				
Average Period of Underwater Navigation (secs)	27000				
Minimum Distance to Sea-floor to be kept (m)	40				
Surface upon completion of this # of dives	4		2		∞
Surface if this amount of hours without stable communications (hrs)	12				
Surface at this particular UTC times	4,12,20				4,12,6,8
Surface if a waypoint is hit within that distance (km)	250				
Altimeter	on	off		on	

Chart 1 Summary of Underwater Strategies (Navigation)

Date (utc)	SEN	fSMP	DRNG	MDIV	MCLI
(from Mission	CTD	0,5000	[-5, 2000]	yes	yes
Start to Mission	OXY	0,5000	[-5, 2000]	yes	yes
End)	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 2 Summary of Commanded Sampling Strategies

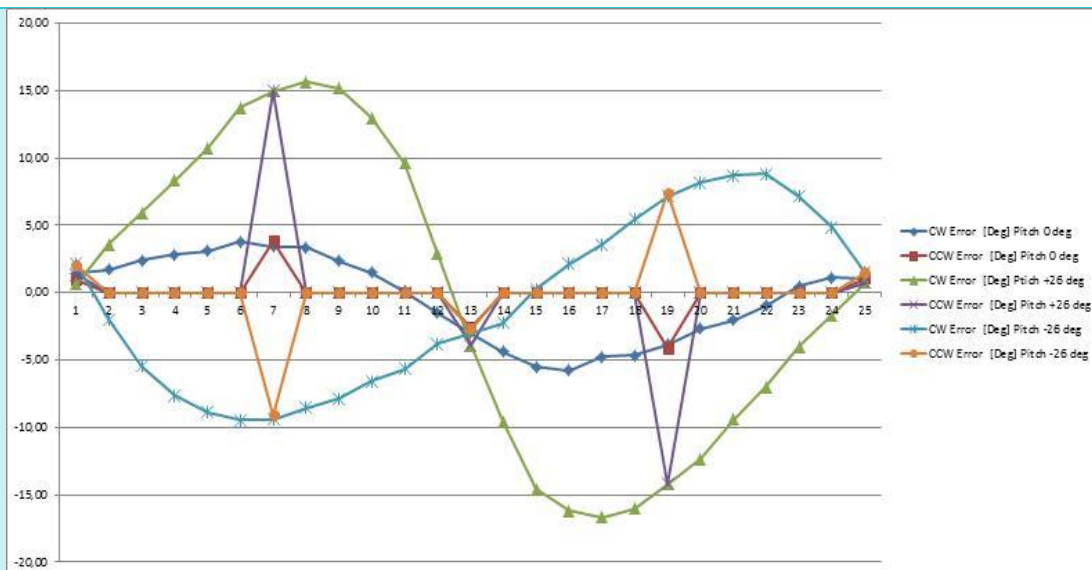


Figure 1-Error measured during Compass Error Check procedure in an electromagnetic-field-free environment located in a forest close to IMEDEA (in Esporles) From 20180306_U243_sdeep00_canales_mar_2018_gfmr0070

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Institute	<p>SOCIB in collaboration with IMEDEA</p> <p>Università di Napoli Parthenope Dipartimento di Scienze per l'Ambiente Tel.: +39-081-5476584 FAX: +39-081-5476515 Centro Direzionale, Isola C4 80143 Napoli (Italy)</p>
Project Affiliation (web-site)	<p>http://www.socib.eu http://www.jerico-ri.eu/infrastructure/socib-glider-facility/</p>
Partnership / Participation	<ul style="list-style-type: none"> • PARTHENOPE (Jerico-Next-TNA granted team) • SOCIB (Accessed Infrastructure) • IMEDEA (in-kind contribution)
Glider Software Version	Nav : v7.13 Acomms, Payload: 3.17
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)	<p>Compass error was measured. Observed error followed a well-known sinusoid-shape although the glider followed traced-route very well(See Figure 1). Re-calibration is needed.</p>
Battery Type	Teledyne lithium Battery Pack (702Ah-nominal capacity) (Reused)
Battery Consumption (Ah)	134.918 Ah (reading from 124.494 Ah to 259.412)
Data Available From	http://thredds.socib.es/thredds/catalog/auv/glider/sdeep00-scb_sldeep000/catalog.html
Further Details	glidertech@socib.es

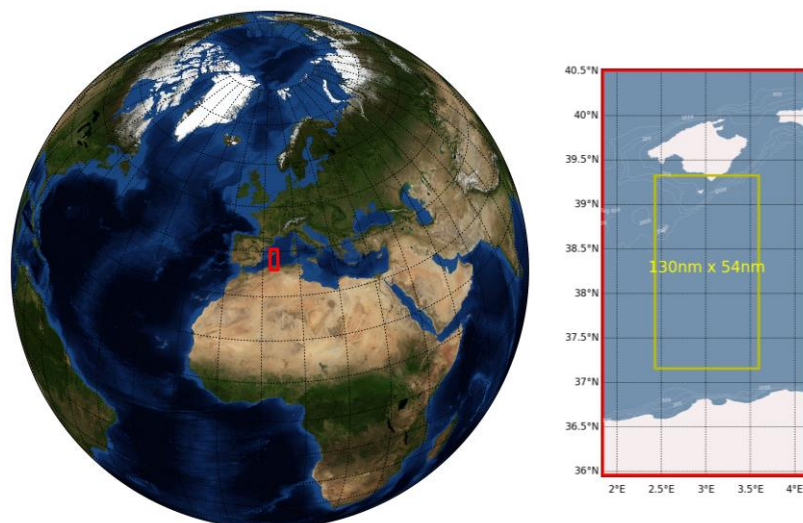
**General
Map**

Figure 2 - Map providing general overview of the Survey Area

On-line
Track

<http://apps.socib.es/dapp/?deployments=817-24-0-FFFF00&layers=none&units=scientific>

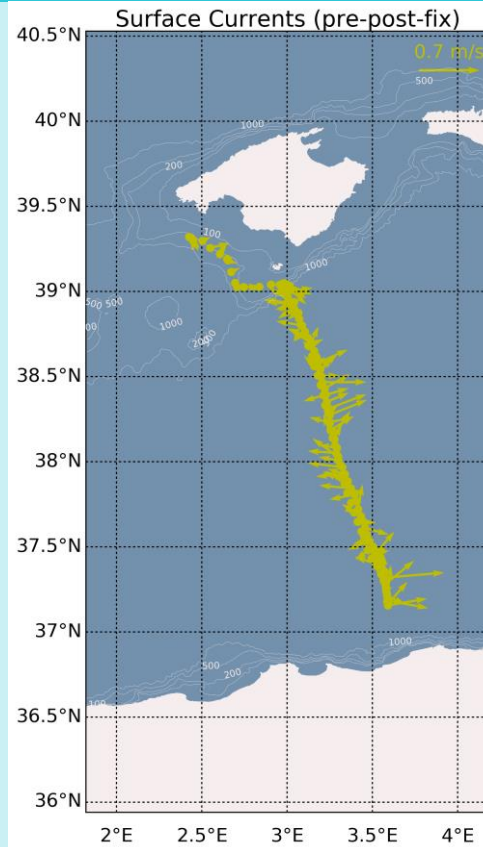
Detailed
Maps

Figure 3 – Surface currents derived from GPS pre and post fix

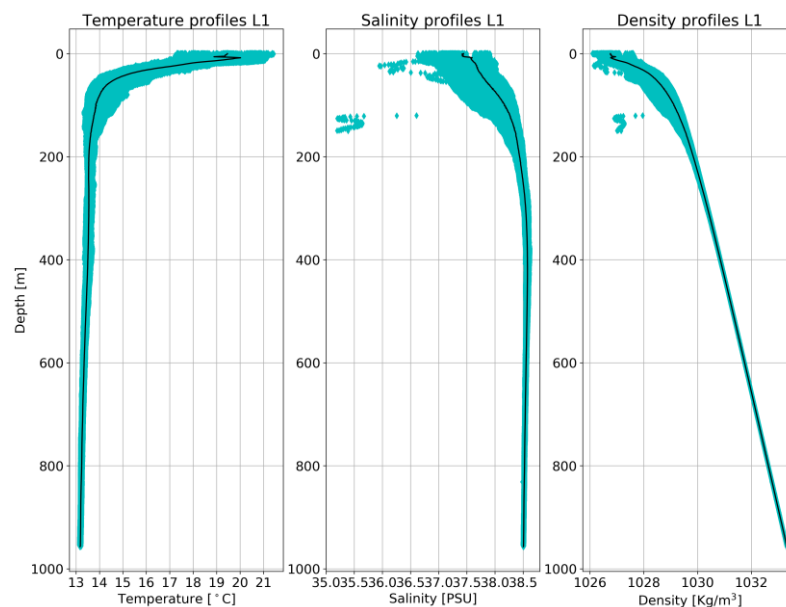
Scientific
Preliminary
ReviewCTD

Figure 4 - CTD profiles

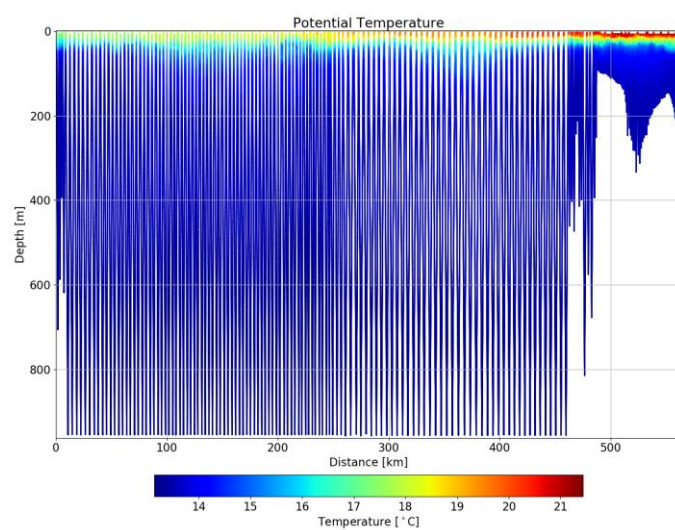


Figure 5 - Potential temperature (full depth range)

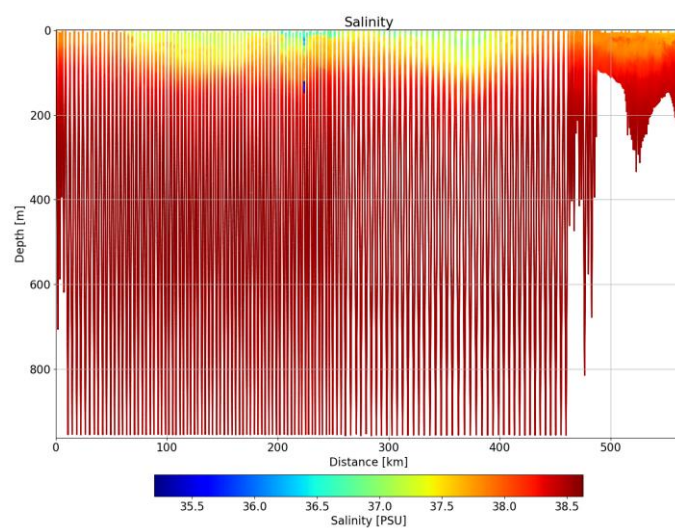


Figure 6 - Corrected salinity (full depth range)

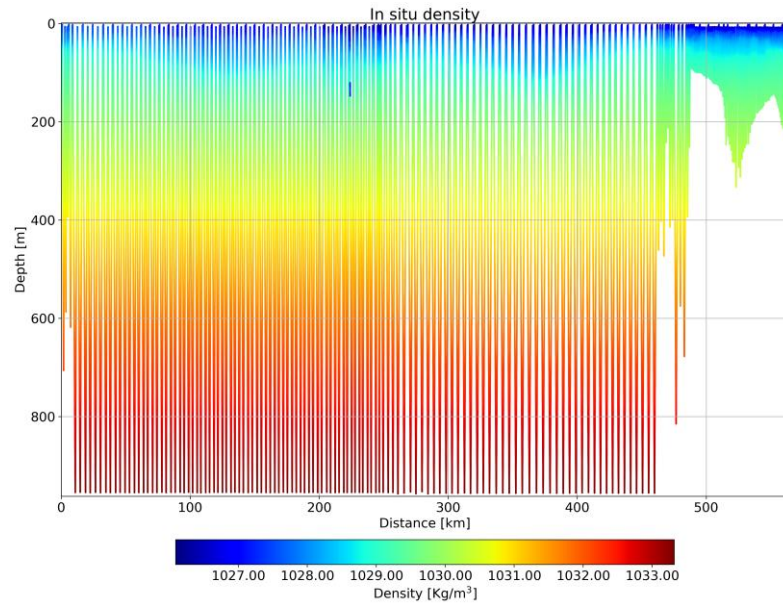


Figure 7 – In-situ Density derived from corrected salinity and temperature (full depth range)

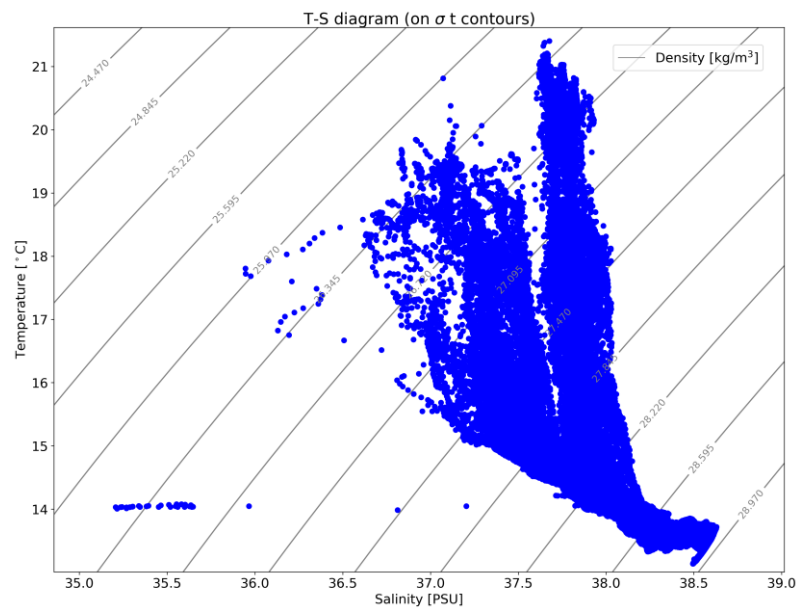


Figure 8 - T-S diagram (thermal-lag corrected)

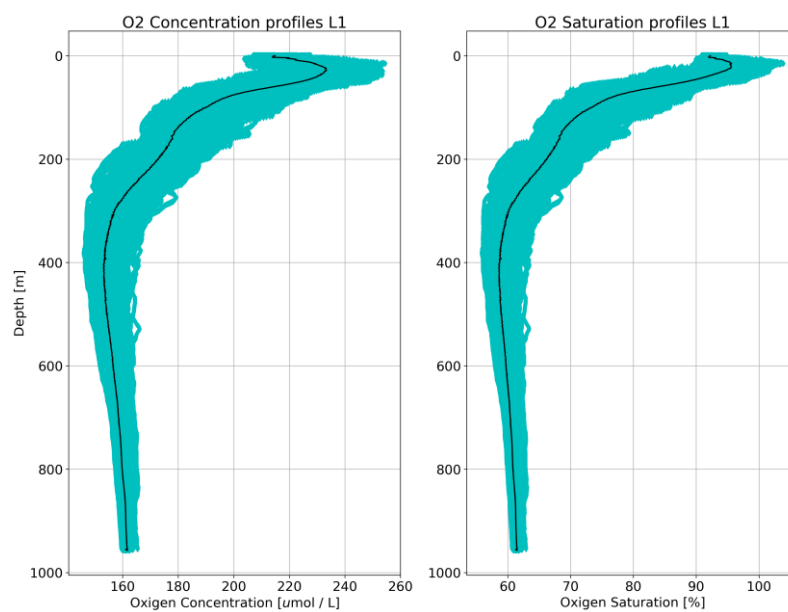
OXYGEN

Figure 9 - In-situ oxygen profiles

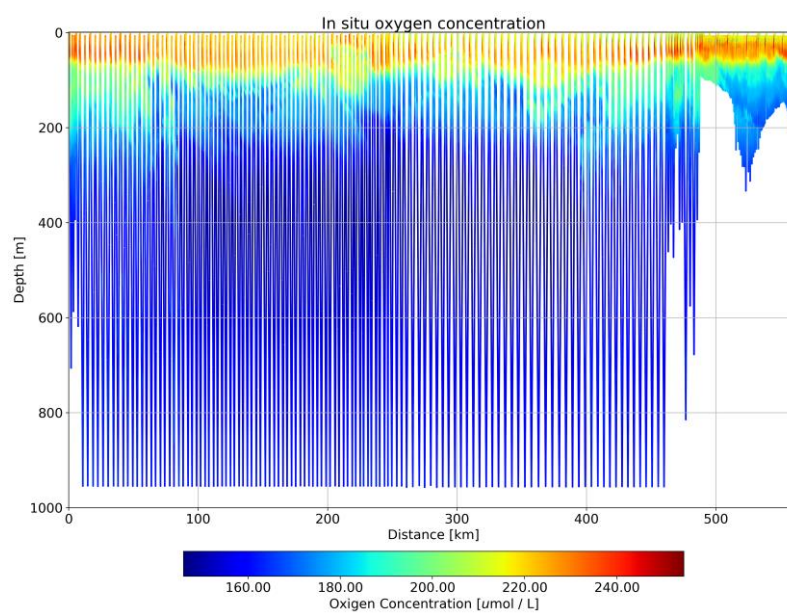


Figure 10 - In-situ oxygen concentration

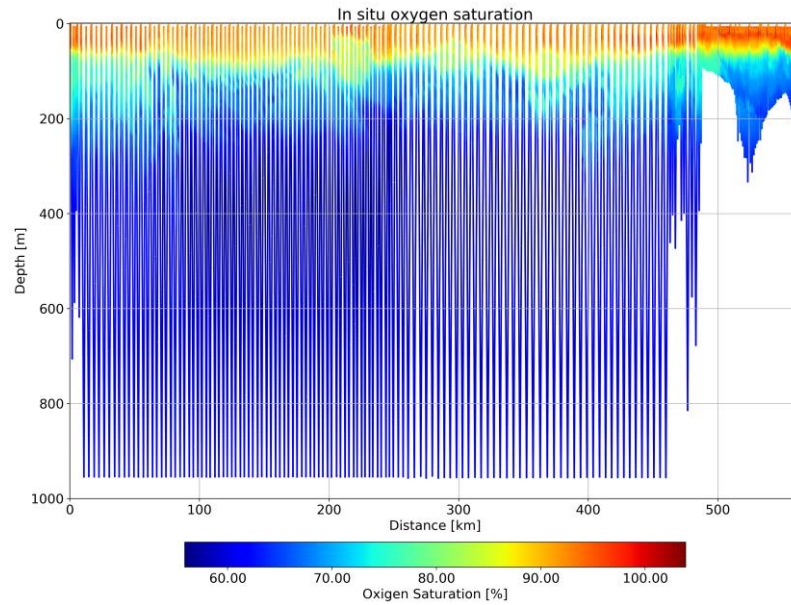


Figure 11 - In-situ oxygen saturation

TURBIDITY & CHLOROPHYLL

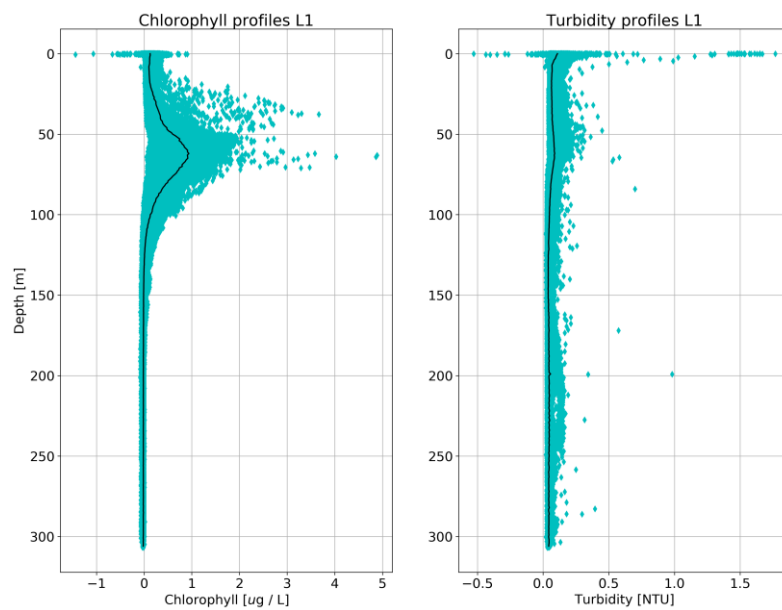


Figure 12 – FLNTU profiles

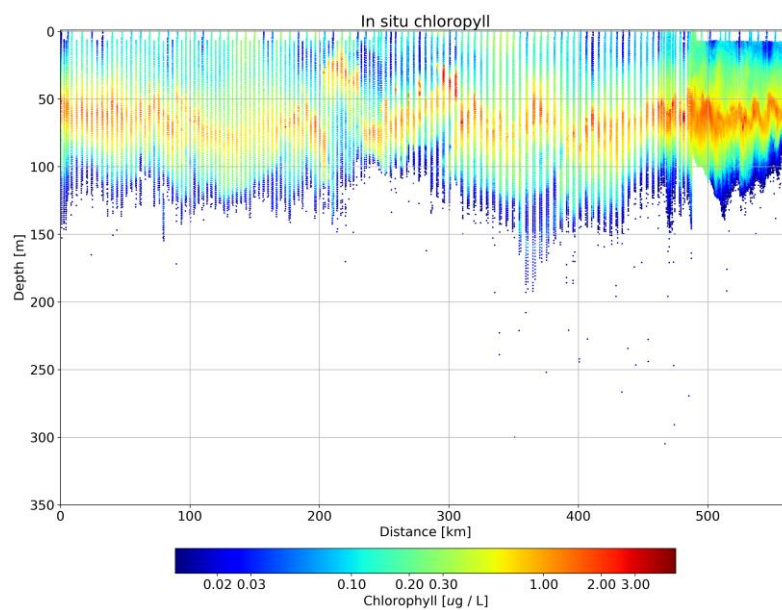


Figure 13 – In situ chlorophyll

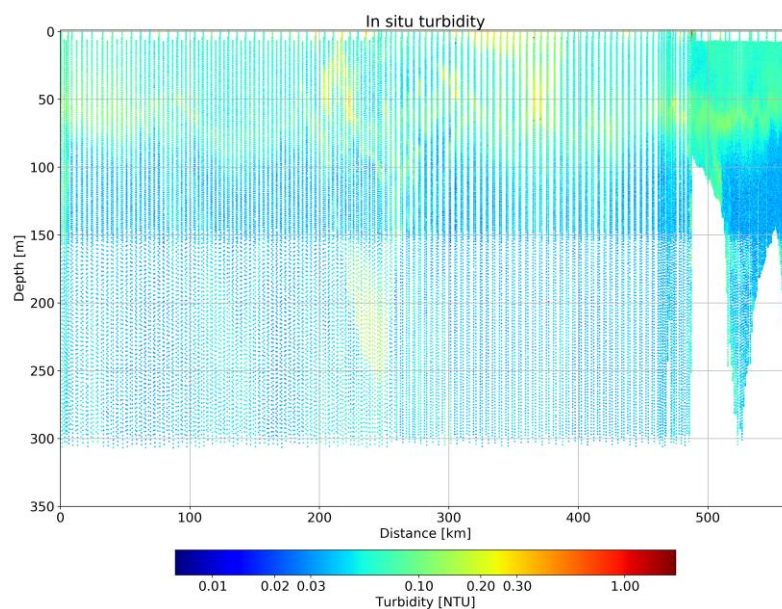


Figure 14 – In situ turbidity