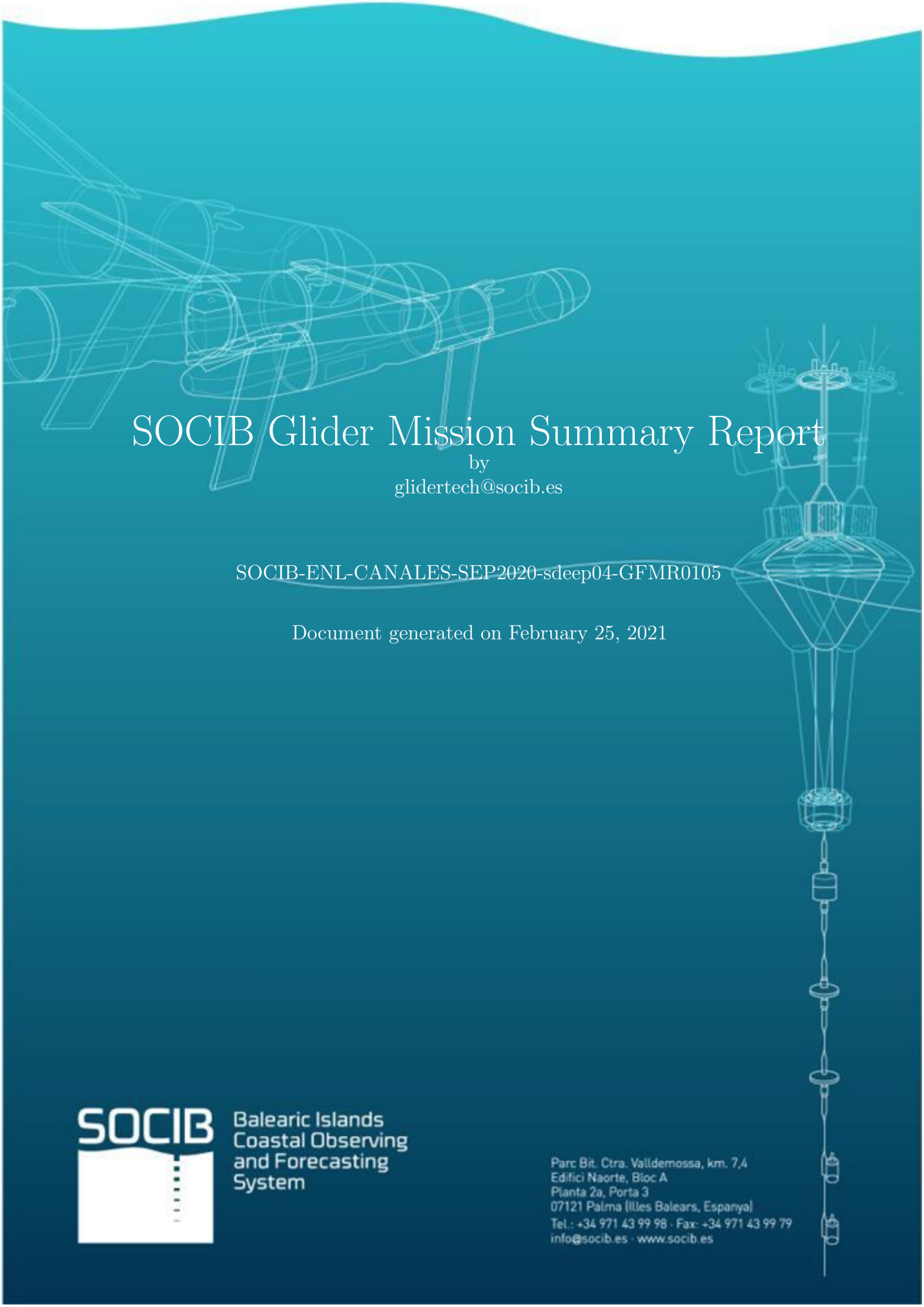

SOCIB Glider Mission Summary Report

by
glidertech@socib.es

SOCIB-ENL-CANALES-SEP2020-sdeep04-GFMR0105

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SOCIB
Balearic Islands Coastal Observing and Forecasting System

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Introduction

The aim of this document is to sumerize the most important events of the mission. It will explain engineering events that could affect the sciencie data and also some fact from the science point of view.

1. Engineering Review

1.1 Summary

Mission name	SOCIB-ENL-CANALES-SEP2020-sdeep04-GFMR0105
Platform Model	Slocum 1000m G2
Platform ID / Name / WMO Code	U567 / sdeep04 / 68997
Related Platforms / Missions	RV canales campaing
Software ver. NAV	8.2
Software ver. SCI	8.2
Mission duration	38.0 days
Mission start	2020-09-29 09:11
Mission end	2020-11-06 08:04
Total distance	803.32[km] 433.76[nm]
Deployment point [dd°mm.mmmm']	N 39°24.1191' E 02°19.6222'
Recovery point [dd°mm.mmmm']	N 39°02.0577' E 01°12.0884'
Battery Consumption (Ah)	202.2(from 56.2 to 258.4)
Survey Area	Western Mediteranean 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.
Abstract	Deployment of Slocum G2 deep glider sdeep04 in endurance line campaign Canales SEP2020 (SOCIB operational program), aiming the coverage of the Eivissa channel (8 transects) and Mallorca channel (1 transect) from SEP to NOV 2020, sampling physical and biogeochemical parmeters (CTD, fluorescence and turibity, and oxygen). Intersampling with RV will be aviable

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Navigation significant events	• Hard currents near Denia, 330º • Fail on Iridium system network • Hard surface currents during the recovery, up to 0.7m/s
Science significant events	• During the summer to fall transition period we observed the surface tempererature in the first 50m of the water column to drop from up to 5 degrees • During the missions several spikes in salinity, turbitiy and chla appeared as the indicate in figures 2.2 and 2.10 • The oxygen data show hysterisis of the oxygen measurements and need further correction using the temperature of the CTD. • The isopycnal has been elevated on 11 of October bringing up nutrients to the euphotic layer as enhancing the observed phytoplankton biomass • Patches of high salinity and high temperature water observed in the Mallorca channel in the upper 50m between 3rd and 6th of October

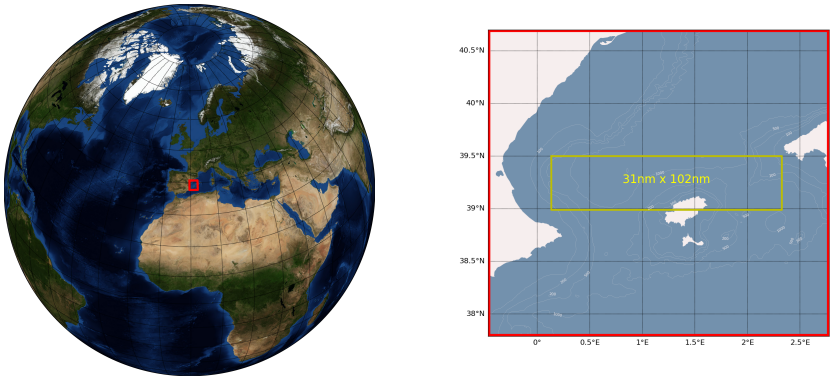

Figure 1.1: Map providing general overview of the Survey Area

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1.2 Metadata

Principal Investigator	Prof. Joaquim Tintoré jtintore@socib.es (+34 971439821)
Institute	SOCIB
Project Affiliation (web-site)	http://www.socib.eu/
Partnership / Participation	• SOCIB • IMEDEA(CSIC-UIB)
Data Retrieval	• RT: sub-set via satellite link at each surface maneuver • DM: full/direct memory card backup after glider disassembly during Conclusion mission-phase
Data Available From	http://thredds.socib.es/thredds/catalog/auv/glider/catalog.html
Further Details	glidertech@socib.es

1.3 Preparation

- Premission: Done
- HardWare: Done. Installed new oxy cable
- Batteries: 20190604-SN0036
- Comm: Done
- SCI: Done
- Ballasting: Target density: 1026.06 gr/L Tank density: 1024,49 gr/L
- Sealing: Done
- Fileset: Done
- CEM: Not performed
- Calanova: Done
- Deployment: Done
- Deployment Notification: Done
- Recovery: Performed with RV in St. Antoni
- Conclusion: Successful

1.4 Mission Survey

- Deployment:
  - Vessel: Socib I
  - Personnel: 1 ETD + 1 GF
  - Location: Cala Figuera
- Navigation: It was satisfactory during most mission time. The glider responded well to the commanded target waypoints. Reduced surface time
- Underwater Maneuvering: Performed well
- Engineering sensors:

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Sensor	Oddities	Warnings	Errors
attitude rev	0	1	0
pitch motor	12	0	0
science super	27	0	0
digifin	793	4	0
IRIDIUM	159	1	0

- Communication Systems (see Apendix for Iridium states):
  - Total number iridium calls [num]: 138.0
  - Iridium calls to secondary [num]: 4
  - ON overall iridium period [s]: 12517.4
  - Iridium calls state from 99 to 10 [num]: 156
  - Iridium calls state from 0 to 99 [num]: 18
  - Iridium calls state from 2 to 99 [num]: 137
  - Iridium calls state from 2 to 99 with c iridium on = 1 (Drop calls) [num]: 1
  - Missed call detected on: 2020-09-29 09:11:00.775150
  - Unestable comms detected on: 2020-09-29 09:11:00.775150
- Contextual/Awareness Sensors:
  - Pressure transducer, internal vacuum and internal temperature worked correctly.
  - Compass also reported coherent values.
  - Altimeter detected the bottom correctly.
- Hull/Hydrodynamics: No signs of problems
- Mission Runs: 2 SCI abort
- Recovery:
  - Vessel: Socib RV
  - Personnel: 3 ETD + 1 GF
  - Location: Sant Antoni, IB

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2. Scientific Preliminary Review

2.1 SCI Profiles

Calibration sheets available upon request to glidertech@socib.es
See apendix for sampling strategy details

Sensor Type	CTD	FLNTU	OXY	PAR
Serial number	CTD sn0064 p	FLNTU sn3711 former2280	OXY sn1409	na
Calibration date	27/06/2019	FLNTU	OXY	na
Casts	1757	878	1758	na
Half Yos	1776	1776	1776	na
Samples	573400	101927	535735	na
Intersample time [s]	5.468	10.114	5.854	na
Sampled distance [km]	474.7	153.3	474.7	na

2.2 SCI plots

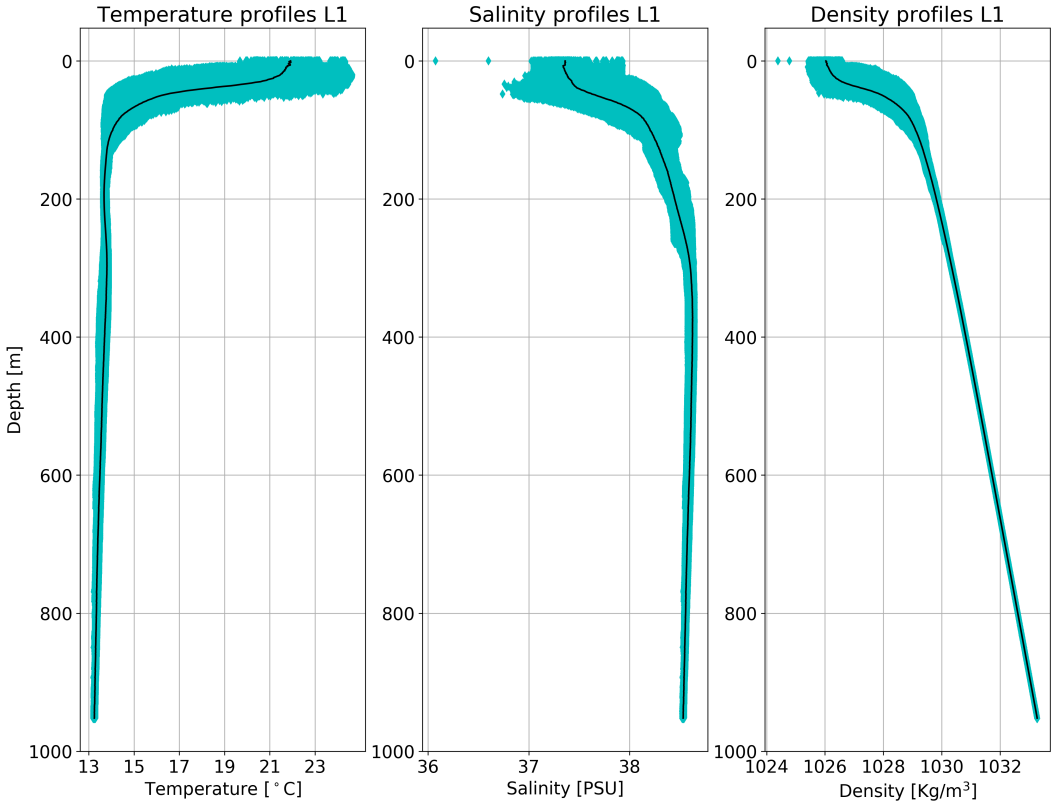

Figure 2.2: CTD profiles

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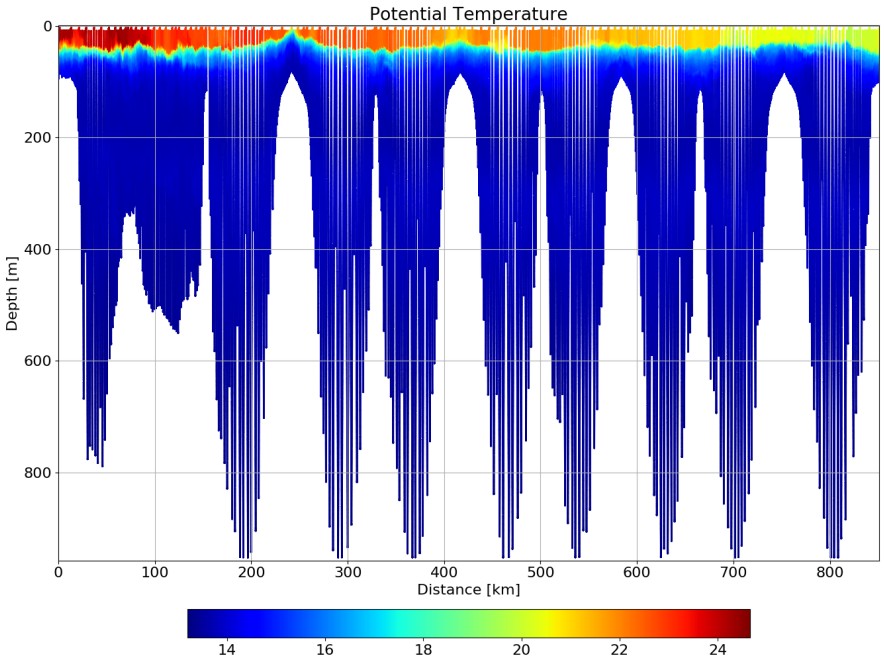

Figure 2.3: CTD temperature

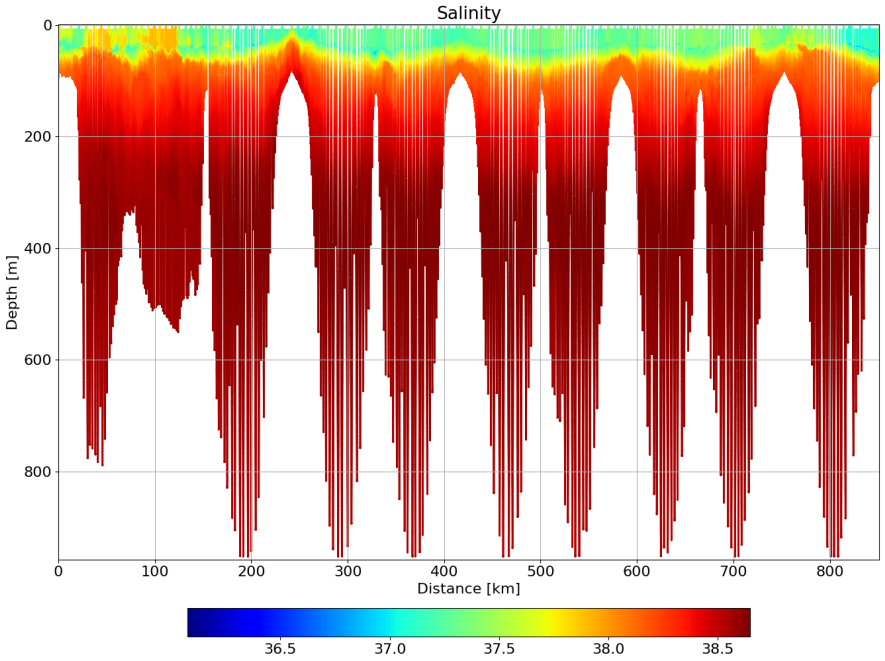

Figure 2.4: CTD Salinity

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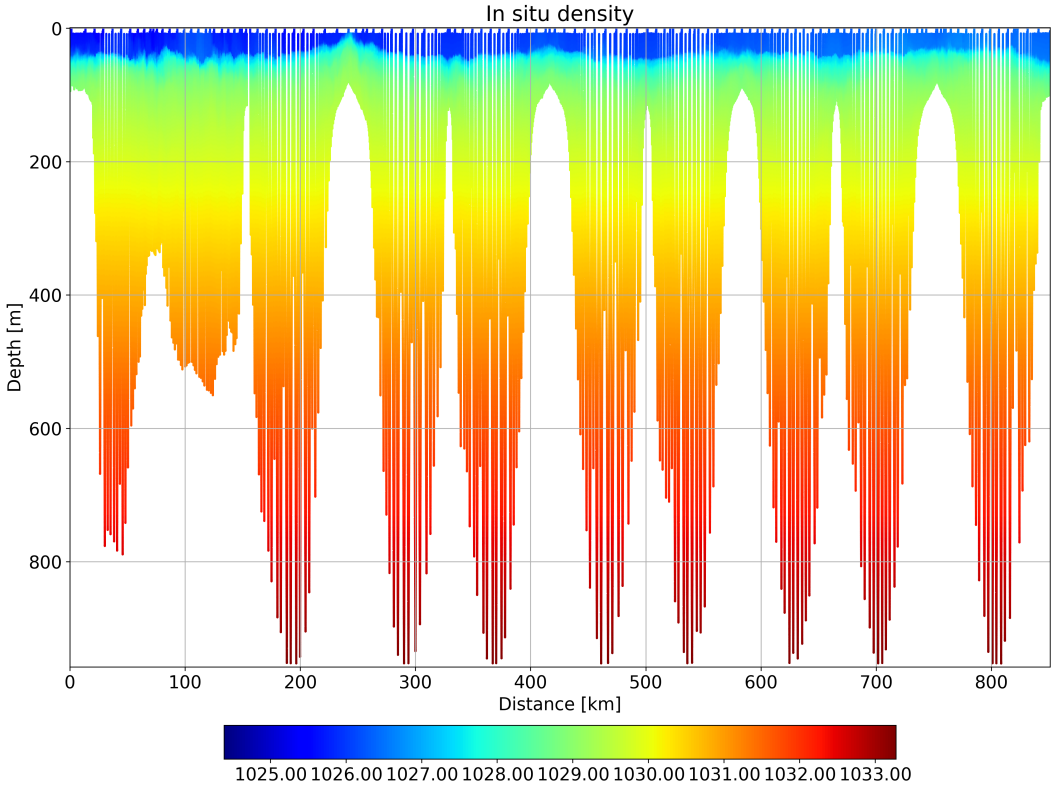

Figure 2.5: CTD Density

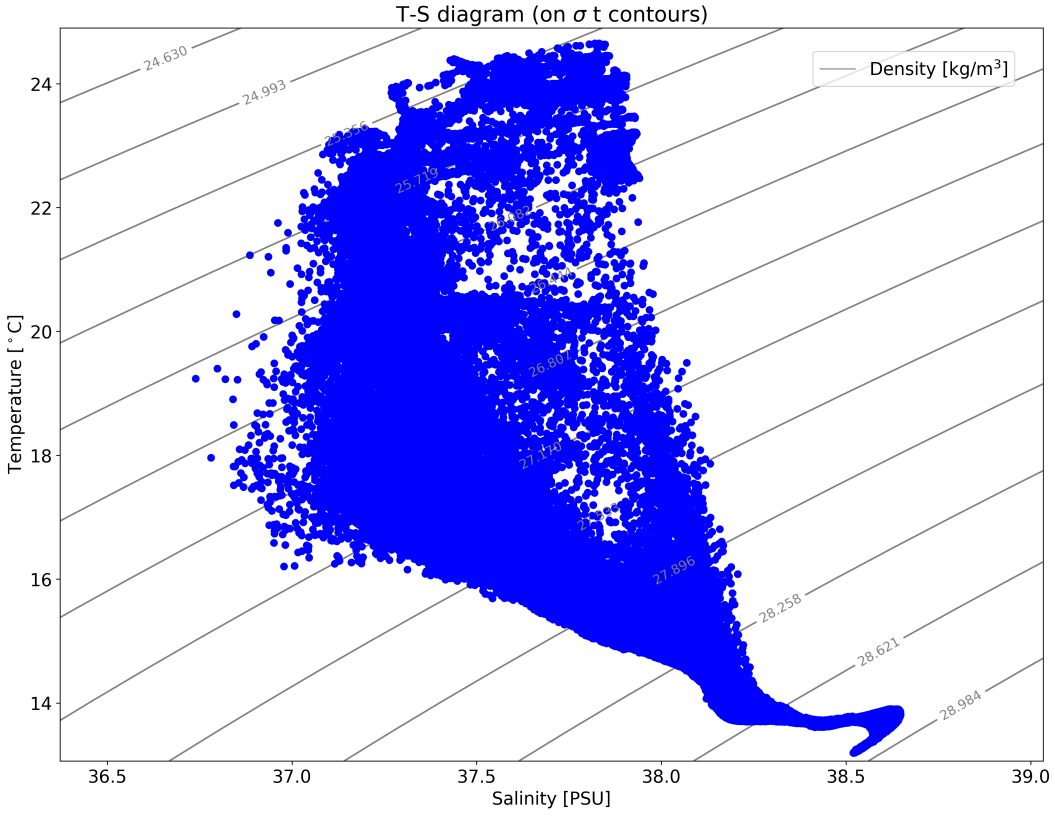

Figure 2.6: TS diagram

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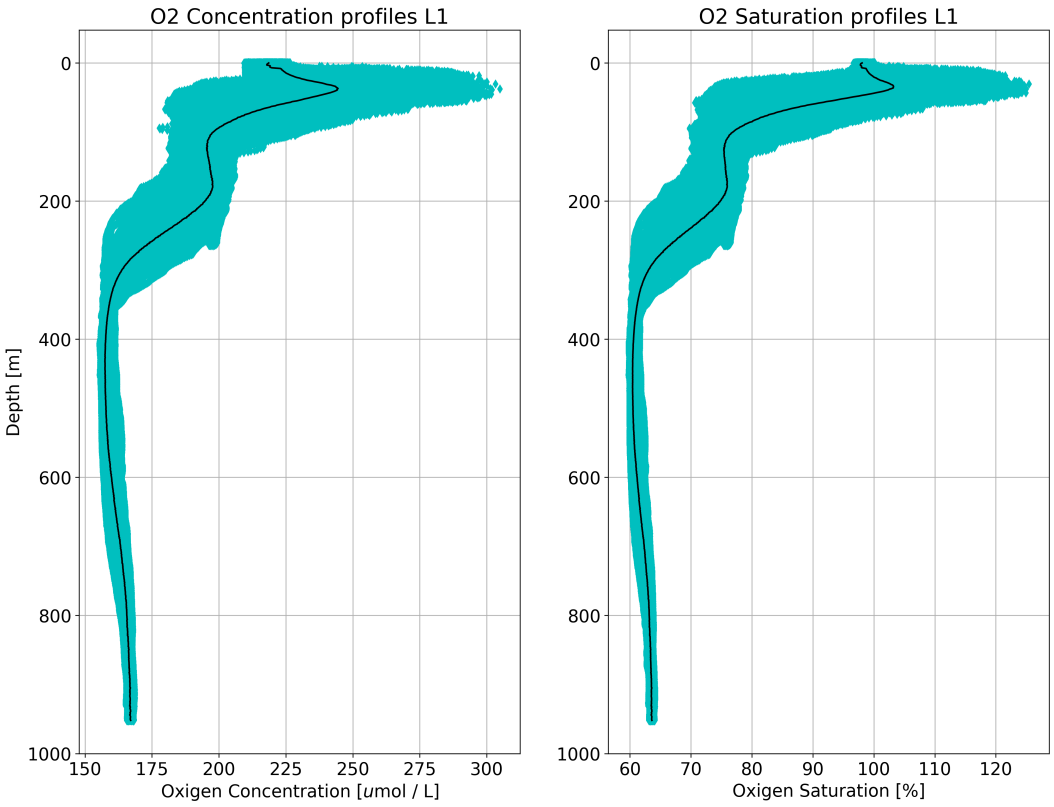

Figure 2.7: Oxygen profiles

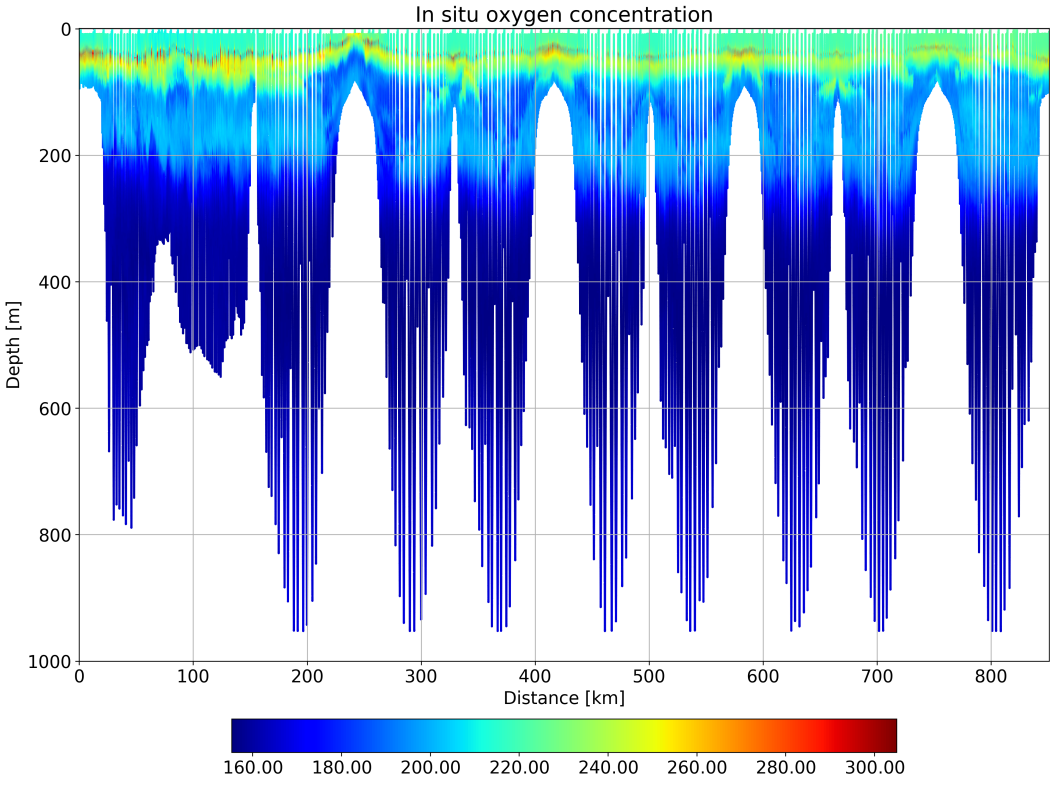

Figure 2.8: Oxygen Concentration

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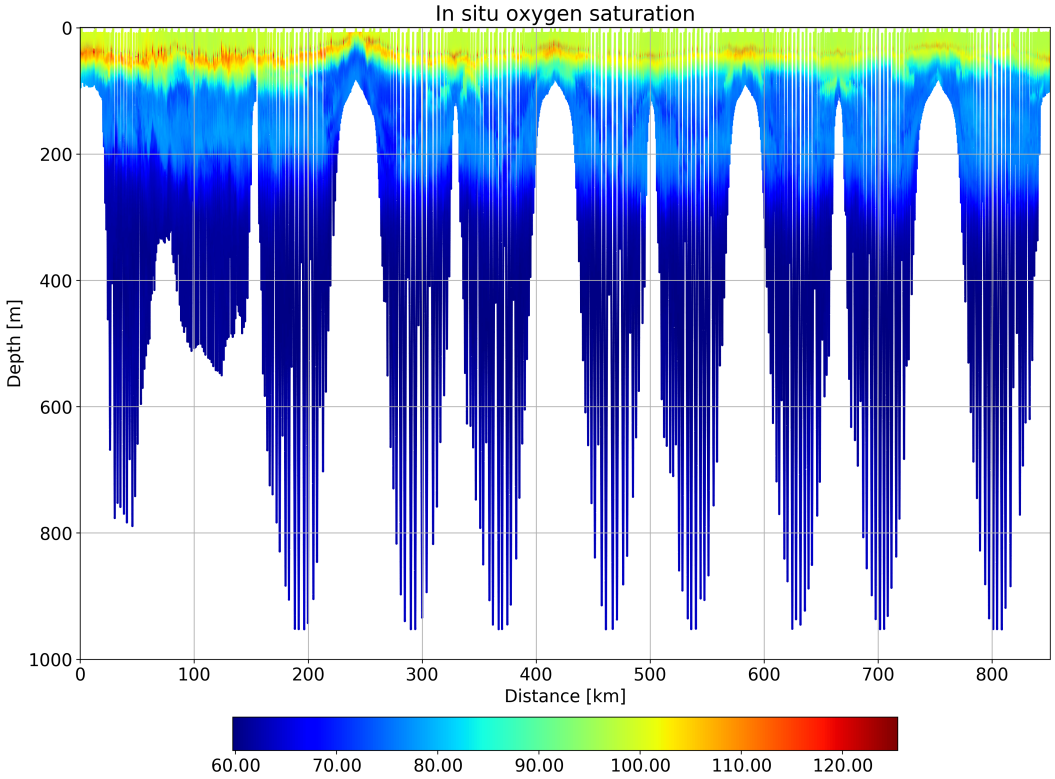

Figure 2.9: Oxygen Saturation

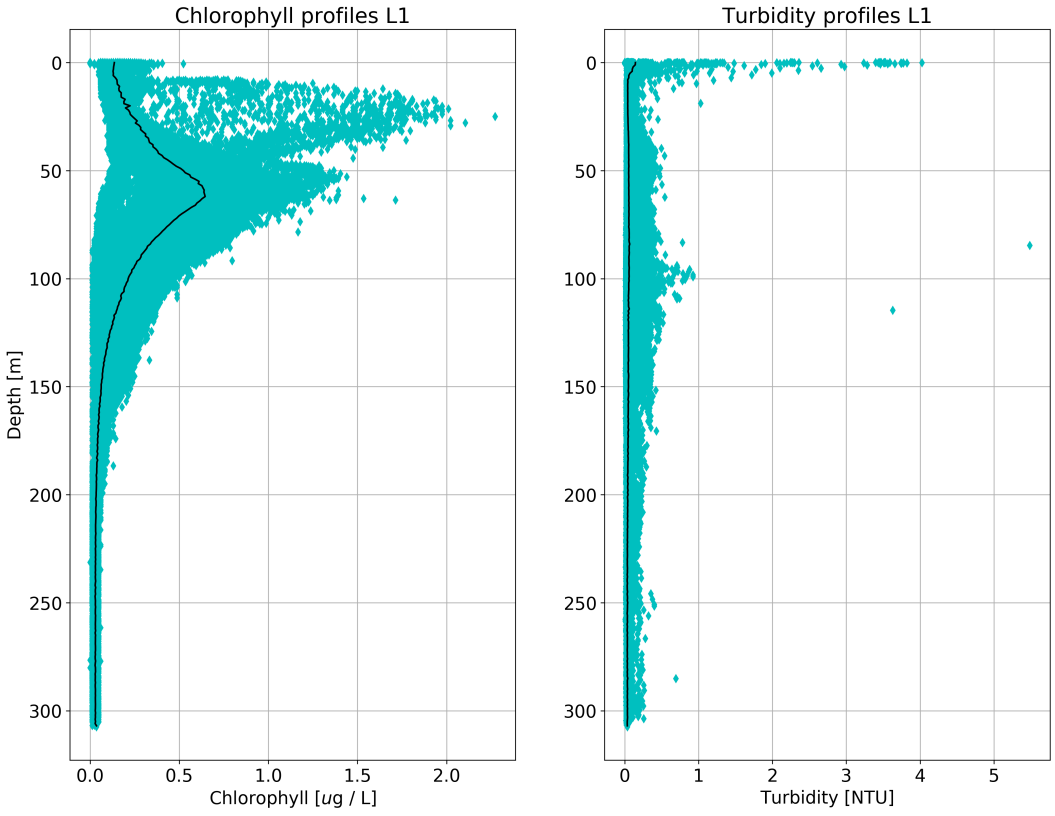

Figure 2.10: Chlorophyll-a and Turbidity profiles

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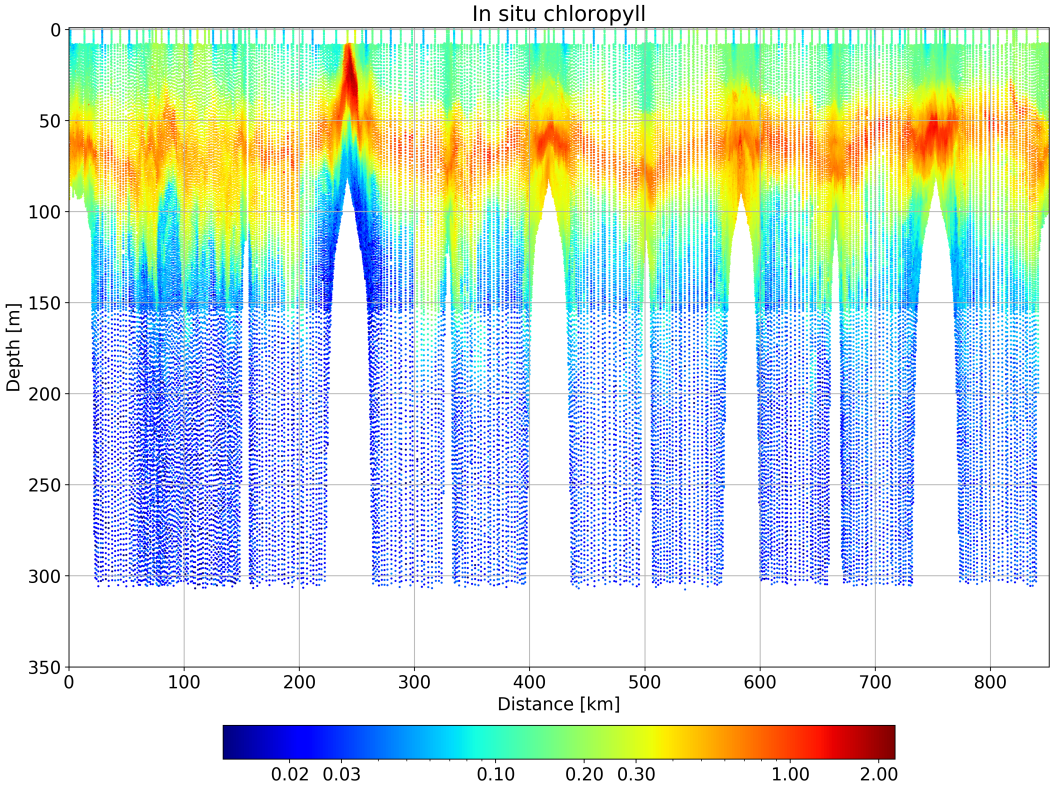

Figure 2.11: Chlorophyll-a

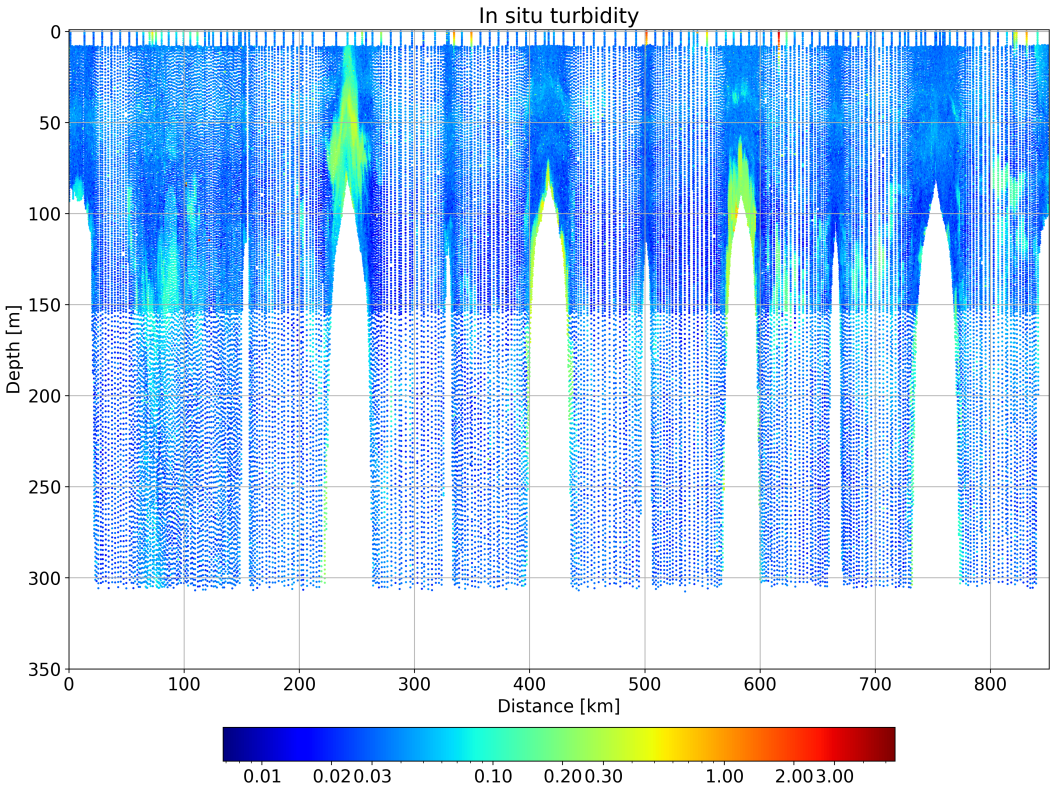

Figure 2.12: Turbidity

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Appendix

Glider behaviour.

Showing changes on behaviour 15:
- 29 Sep 2020 08:47:24 @ Sampling of: SAMPLE13.MA OXY5013-sn1409
- 29 Sep 2020 08:47:25 @ Sampling state to sample set to: Diving and climbing
- 29 Sep 2020 08:47:25 @ Sampling argument: intersample time set to: 4.0 s
- 29 Sep 2020 08:47:25 @ Sampling nth yo to sample set to: 1.0 nodim
- 29 Sep 2020 08:47:25 @ Sampling argument: min depth set to: -5.0 m
- 29 Sep 2020 08:47:25 @ Sampling argument: max depth set to: 2000.0 m

Showing changes on behaviour 14:
- 29 Sep 2020 08:47:25 @ Sampling of: SAMPLE14.MA FLNTU(-150m to -300m)
- 29 Sep 2020 08:47:26 @ Sampling state to sample set to: Diving
- 29 Sep 2020 08:47:26 @ Sampling argument: intersample time set to: 16.0 s
- 29 Sep 2020 08:47:26 @ Sampling nth yo to sample set to: 1.0 nodim
- 29 Sep 2020 08:47:26 @ Sampling argument: min depth set to: 150.0 m
- 29 Sep 2020 08:47:26 @ Sampling argument: max depth set to: 300.0 m

Showing changes on behaviour 13:
- 29 Sep 2020 08:47:26 @ Sampling of: SAMPLE12.MA FLNTU(surface to -150m)
- 29 Sep 2020 08:47:27 @ Sampling state to sample set to: Diving
- 29 Sep 2020 08:47:27 @ Sampling argument: intersample time set to: 8.0 s
- 29 Sep 2020 08:47:27 @ Sampling nth yo to sample set to: 1.0 nodim
- 29 Sep 2020 08:47:27 @ Sampling argument: min depth set to: -5.0 m
- 29 Sep 2020 08:47:27 @ Sampling argument: max depth set to: 150.0 m

Showing changes on behaviour 12:
- 29 Sep 2020 08:47:27 @ Sampling of: SAMPLE11.MA CTD(Profile)
- 29 Sep 2020 08:47:28 @ Sampling state to sample set to: Diving, climbing and hovering
- 29 Sep 2020 08:47:28 @ Sampling argument: intersample time set to: 4.0 s
- 29 Sep 2020 08:47:28 @ Sampling nth yo to sample set to: 1.0 nodim
- 29 Sep 2020 08:47:28 @ Sampling argument: min depth set to: -5.0 m
- 29 Sep 2020 08:47:28 @ Sampling argument: max depth set to: 2000.0 m

Showing changes on behaviour behavior yo 11:
- 29 Sep 2020 08:47:28 @ Yoing num half cycles to do(nodim) set to: 2.0
- 29 Sep 2020 08:47:28 @ Yoing d target depth(m) set to: 5.0
- 29 Sep 2020 08:47:28 @ Yoing d target altitude(m) set to: 20.0
- 29 Sep 2020 08:47:28 @ Yoing d use pitch(enum) set to: 3.0
- 29 Sep 2020 08:47:28 @ Yoing d pitch value(X) set to: -0.453800
- 29 Sep 2020 08:47:29 @ Yoing c use pitch(enum) set to: 3.0
- 29 Sep 2020 08:47:29 @ Yoing c pitch value(X) set to: 0.453800
- 29 Sep 2020 09:13:39 @ Yoing d target depth(m) set to: 950.0
- 29 Sep 2020 09:52:17 @ Yoing num half cycles to do(nodim) set to: -1.0

Iridium states:
- MODEM NO CARRIER = 0
- MODEM OK = 1
- MODEM CONNECT = 2
- MODEM ERROR = 3
- MODEM NO ANSWER = 4
- MODEM BUSY = 5
- MODEM NO DIALTONE = 6
- LOGGING IN = 7

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- LOGGED ON = 8
- MODEM AWAITING OK = 10
- MODEM AWAITING CONNECTION = 11
- MODEM TIMEOUT = 12
- MODEM UNKNOWN = 99
- NO CHARS TIMEOUT = 100

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