SOCIB Balearic Islands Coastal Observing and Forecasting System

CRUISE REPORT

SOCIB Canales WINTER 2020:

11th to 13th February 2020

SOCIB_ENL_CANALES_FEB2020_WINTER

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Description:	A repeat seasonal hydrographic survey of the Balearic Sea, monitoring the Ibiza and Mallorca Channels. 28 CTD stations were carried out over 3 days; the stations forming one transect across the Mallorca Channel (MC) and two transects across the Ibiza Channel (IC). Two SVP-B surface drifters were also deployed in the Ibiza Channel. ICES-SeaDataNet Cruise Summary Report BSH-RefNo: **20203043.**
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Supervision:	E. Alou-Font
Keywords:	Mediterranean; Ocean Circulation; Balearic Sea; Ibiza Channel; Mallorca Channel; Northern Current;

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CHANGE RECORD

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1.0.0	2020-02-20	v1.0 of document	A.Cabornero/ E.Alou-Font	E. Alou-Font
1.1.0	2020-03-03	Added data references and CSR links	A. Cabornero	E. Alou-Font

1.1.1	2020-03-05	Lagrangian platforms update	L. Diaz	E. Alou-Font
2.0.p	2020-04-02	Changed the order of section “Instrumentation description and configuration”	A.Cabornero	
2.0	2020-04-29	Added final ADCP figures	A. Cabornero	E. Alou-Font/J. Allen

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Objectives

The **Canales cruises** have the following objectives:

1. To make two complete SOCIB-Canales CTD sections across the Ibiza Channel (IC) and a CTD section across the Mallorca Channel (MC). The purpose of these sections are seasonal calibration points for the near continuous Glider monitoring of the IC. Measurements are made with the SeaBird SBE9 + instrument and the oceanographic Niskin bottle rosette for water samples at different depths.
2. To make continuous current profile sections of the IC and MC using the vessel mounted acoustic Doppler current profiler (VM-ADCP). These sections are for comparison with model forecasts and to support depth averaged velocity (DAV) calculations from glider data.
3. Perform a synchronized CTD cast with the current operating G2 glider in the Ibiza channel if possible.
4. Deployment and recovery of Canales gliders as and if necessary.
5. Deployment of lagrangian platforms as necessary.

Onboard personnel

ID	Name	Role	Affiliation
1	N.Wirth	Chief Scientist (E. Alou-Font remote support)/ Lead ETD Technicians /CTD/ADCP (J. Allen remote support)	SOCIB
2	Andrea Cabornero	Biogeochemical sampling and analyses lead	SOCIB
3	Sara Vieitez	Biogeochemical sampling support (ME Msc student)	UIB/SOCIB
4	Josep Baeza	ETD Technician/CTD	SOCIB

5	Pau Balaguer	ETD Technician/CTD	SOCIB
6	Carlos Castilla	ETD Technician/CTD	SOCIB
7	Aida Frank	Biogeochemical sampling support (PhD student)	UIB
8	Ana Escolano	Biogeochemical sampling support (ME Msc student)	UIB/IMEDEA

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Station plan

28 CTD stations were carried out over a period of 3 days; one complete transect in the Mallorca Channel (MC) and 2 complete transects in the Ibiza Channel (IC, see Figure 1) .

A ship activity log detailing actions carried out during the cruise is provided in Appendix 1.

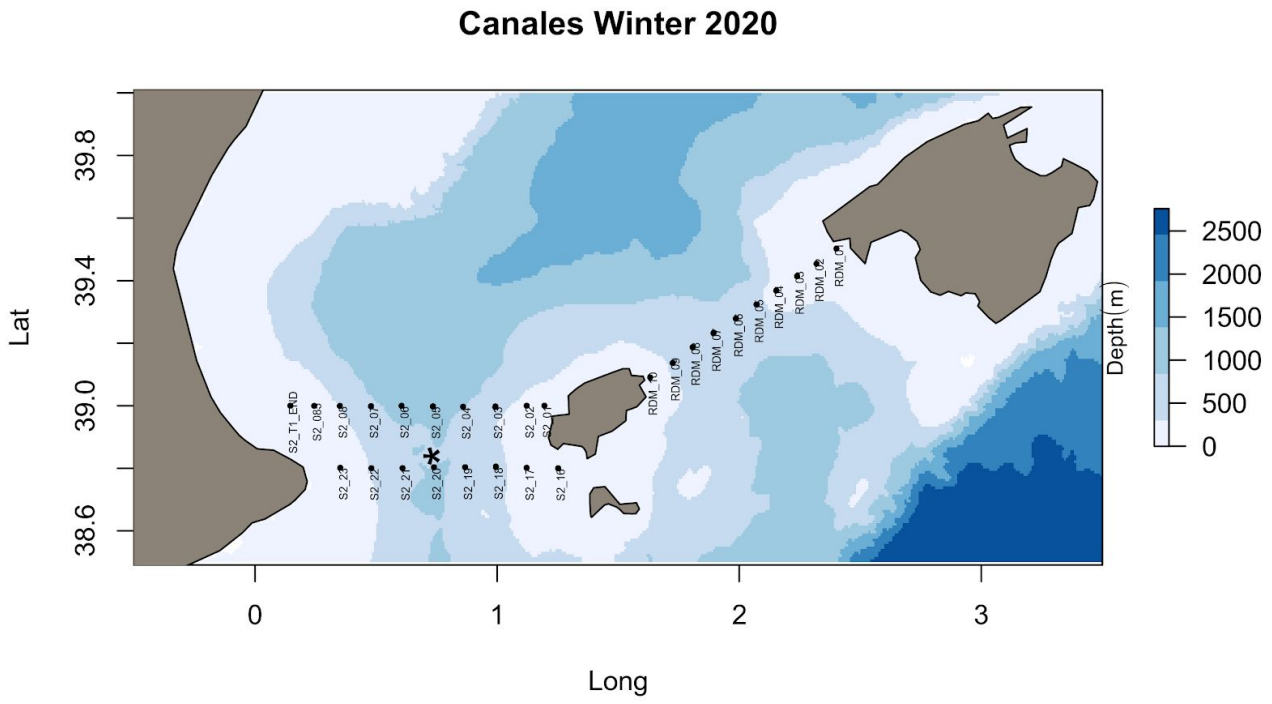


Fig. 1: Study area with the station plan. * Surface drifters launching point.

Cruise diary

DAY 1 - 11th FEBRUARY 2020

08:02 Leaving Harbour of Palma cloudy 6/8 and less than 2 knots wind from South

08:20 Safety-talk with the whole crew on the upper deck

08:40 Sailing out of Palma bay - 0.5 m waves from S-SSW, sailing 12 kn

09:36 RADMED_01 CTD cast deployment. ADU800 and ADCP working fine, Termosal working fine

09:47 CTD onboard, all bottles closed. Seaboard looks fine, but wind direction and velocity changing according to vessel speed and direction -> this indicates that we are NOT showing the real wind!

10:22 Station RADMED_02 CTD in the water

10:30 CTD on board Station completed, all bottles closed Sailing 11.5 knots to next station

10:59 station RADMED_03 CTD in the water cloudy 4/8, nearly no wind but 0.5m waves from SSW

11:08 CTD on board at station, the deployment and recovery are being performed very smoothly and slowly. It takes around 3-5 min more at station but ship-crew is doing perfect. Sailing 11.5 knots to next station

11:40 station RADMED_04 CTD in the water, currents 0.3-0.5 knots NNE

11:52 CTD on board. Sailing 11.5 knots to next station

12:20 taken 2 water samples from the thermosal 1 minute before arriving RADMED_05
12:24 station RADMED_05 CTD in the water less cloudy and sun is coming out currents 0.5-0.6 knots NNE drift 600 m during cast.

12:51 CTD on board, Sailing 11.2 knots to next station

13:00 16 min to station RADMED_06, In the AIS a trawler (Fishing Vessel) it's been observed just passing the point sailing at 3 knots. ADCP is running in Bottom-track mode.
13:23 station RADMED_06 CTD in the water drift 710 m direction NEN, currents around 0.6

knots sunny, little high clouds 2/8.

13:48 CTD onboard. At the bottom it could be observed an increase of turbidity …. (Trawler, 30 min before) Sailing 11.5 knots to next station

14:22 Station RADMED_07 CTD in the water

14:50 CTD onboard sailing 11.6 knots to next station.

15:25 station RADMED_08 CTD in the water

15:48 CTD onboard. Sailing 11.7 knots to next station

16:18 Station RADMED_09 CTD in the water calm sea conditions, currents 0.2 knots, sunny with high cloud slices. No drift

16:32 CTD onboard

17:04 station RADMED_10 CTD in the water Nearly no currents, 0.2-0.3m waves, very good condition.

17:12 CTD onboard RADMED finished without any complications. CTD and bottles have worked all well sailing 11.5 knots to port

17:30 Finished the sampling for today. Sailing to port (Sant Antoni-IBIZA)

19:03 Stopped sea surface sampling (Thermosal)

19:05 Stopped ADCP Hit the waypoint to enter in the Sant Antoni Bay.

19:08 entering in port

19:16 Tied up at dock

22:50 Switched on the Drifters SVP .

General Observations:

- The waypoints used by the captain, are in degree decimals, the waypoints used in the lab are in degree, minutes decimal. At some stations there can be observed differences of 200 m.
- The SBE-deck unit (CTD) has been switched off between the stations.

- The turbidity-sensor performed better than during last cruise, less spikes in down and upcasts are observed.
- Difference between the two salinity sensors: 0.002 - 0.003.
- Difference between the two temperature sensors: 0.000 - 0.001.
- 2 bottles for salinity samples have been taken at each cast at the selected depths (by the scientist in charge).

Fig. 2: Canales winter 2020 cruise participants.

DAY 2 -12th FEBRUARY 2020

08:02 Leaving Harbour of Sant Antoni, Ibiza nearly no waves, cloudy 7/8, and very foggy The 2 Drifters haven't sent any signal

08:10 ADCP on remote controlled by John Allen, starting in water-track mode

08:16 Thermosal on

08:25 Coordination with the Glider Team. The Glider hit the waypoint in Denia and is now back on its way to Sant Antoni. The position will be updated at 12:00 UTC

08:30 Station S2_01 CTD in the water wind speed 4-6 knots, wind direction 300º, 0.3 m waves and cloudy 7/8

08:39 CTD onboard sailing 11.2 knots to next station

09:00 station S2_02 CTD in the water.

09:12 CTD onboard

09:48 Station S2_03 CTD in the water

10:15 CTD on board

10:50 Station S2_04 CTD in the water 0.5-0.6 m waves, wind speed 20 knots

11:15 Drifter Reset

11:25 CTD onboard sailing at 11.6 knots to the next station

12:00 station S2_05 CTD in the water

12:38 CTD onboard

13:22 It had been detected that the configuration file used during the morning was the used in RADMED_06 from yesterday, it has been changed to the original one.

13:24 station S2_06 CTD in the water the turbidity sensor is quite “spikey”

13:50 Update with the Glider Pilots, last position was at the 500 m line, 3 km south of the monitoring line at 12:00 UTC. Next update will come at 16:00 UTC Best cast for intercalibration is established as station S2_07

13:57 CTD onboard Sailing to next station 11.8 knots

14:20 After a phone conversation with Inma Ruiz, it’s confirmed that the 2 drifters are transmitting. The problem observed was due to a failure in the webpage of the NOAA. The decision is taken to deploy the drifters tomorrow at Station S2_20

14:30 Station S2_07 CTD in the water Short break (software crash) at 14:44- 530 m during the downcast. The downcast had been stopped for 1 minute to verify that everything is working. The downcast has been continued. In both casts, up and down cast can be observed spikes during the profile with the turbidity sensor (nothing loose observed on the CTD before deployment). Calm sea 0.3m waves, wind speed 5 knots, cloudy 4/8 .

15:03 CTD onboard It had been checked the CTD as well as the downcast at the moment when the CTD stopped and no anomalies had been found. Sailing to the next point with 11.9 knots

15:40 Station S2_08 CTD in the water

15:56 CTD onboard

16:23 Station S2_085 CTD in the water

16:32 CTD onboard (a lot of wood floating around) Wind Speed 8 knots, 0.2 m waves sailing to next point with 12.2 knots

17:02 Station S2_T1_END CTD in the water very very noisy the turbidity profile during the upcast

17:09 CTD onboard - A lot of garbage and wood floating at surface

17:25 Completed sampling of the northern line of the Ibiza Channel

17:30 Starting with the preparation and set up for the oxygen-analysis

17:50 ADCP off Thermosal off

18:02 Entering in the port of Denia

18:14 Tied up in port

23:55 Finished with the oxygen analysis.

General Observations:

- The satellite connection is not working since today morning. It had been realized just in the moment when we lost the 3G signal.
- I don't believe the meteorological data form the weather station onboard. Calculations for wind speed and direction are not according to what can be observed on deck. Also the difference from true wind and apparent wind seems not realistic, comparing the vessel sailing and stopped at station.

Fig. 3a: Location of the glider intercalibration cast (station S2_07).

Fig. 3b: Dissolved oxygen (left and upper right) and chlorophyll (right bottom) sampling, analyses and filtration process.

DAY 3 - 13th FEBRUARY 2020

07:58 Leaving Harbour of Denia Nearly no waves, cloudy 7/8, wet and foggy getting less foggy leaving the coast behind us.

08:45 Satellite connection fixed,

08:59 Station S2_23 – CTD in the water Seasave software at PC Lab 1 stopped at 70 m. Also video and other softwares stopped during 1 min. Cast cancelled and repeated. Turbidity sensor very noisy

09:13 CTD onboard Sailing to next station with 11.2 knots

09:17 Contacted with journalist form the “Diario de Ibiza”

09:46 Station S2_22 – CTD in the water. No changes made but turbidity sensor is being less noisy (down/upcast) Wind Speed 17 knots, 0.5 m waves, cloudy 4/8

10:05 CTD onboard Sailing to next station with 11.4 knots

10:41 Station S2_21 – CTD in the water Turbidity sensor working fine, upcast with less spikes than downcast

11:15 CTD onboard Sailing with 11.8 knots to the next station Preparation of the SVP drifters for the deployment after the next station S2_20

11:49 Station S2_20, CTD in the water Drifter prepared for deployment on aft-deck

12:30 CTD onboard

12:31 Deployment Drifter SVP004, sailing with 4 knots

12:32 Deployment Drifter SVP005, sailing with 4 knots Wind Speed 10 knots, 0.5 m waves.
12:35 Sailing to next station with 12.0 knots

13:00 Engines stopped It had been observed a problem in the water refrigeration circuit responsible for the cooling of the hydraulic oil.

14:05 Everything fixed and continuing to next station

14:17 Station S2_19, CTD in the water

14:46 CTD onboard Sailing 12.0 knots to next station

15:27 Station S2_18, CTD in the water 0.5 m-0.6 m waves, windy and sunny

15:50 CTD onboard Sailing 11.7 knots to next station

16:22 Station S2_17, CTD in the water.

16:32 CTD onboard

17:02 Station S2_16, CTD in the water

17:13 CTD onboard

17:20 Between Captain and chief scientist had been taken the decision sail directly back to Palma and not enter for the night in the port of Ibiza. Both crews, scientists as ship crew prefer this decision.

17:30 Finished with the sampling of the last station. Starting with cleaning up the laboratory and preparing for oxygen analysis. Finally communication with the journalist from the Diario de Ibiza was not possible.

19:00 Lab cleaned up, starting with stabilizing the lab temperature for oxygen analysis. 19:35 starting with oxygen analysis

23:15 Termosal off

23:19 ADCP off

00:15 Tied up in the harbour of Palma

00:45. Finished oxygen analysis

01:30 Cleaned up lab.

- END of SOCIB CANALES WINTER 20 -

General Observations:

- The demobilisation is organized for Friday 14/02/2020 starting from 09:00 o´clock. The ETD and the Biochem-leader will remove all material from the vessel,

including the rosette.
- The data (CTD, ADCP, TS) are copied to an external hard disc and with the sampling and CTD notes and logbooks will be together transported to SOCIB by Andrea Carbonero.

Fig. 4: Preparation for the surface drifters launching.

Incidences to be notified before next cruise

A communication to the various facility coordinators will be conducted (via email or electronic form) regarding the following topics:

DATACENTER: URGENT, the SEABOARD is not working correctly, calculation from wind speed and direction are wrong. The DC has been informed several times in the past. Additionally (in the internal SEABOARD) a lot of lacks in position and stepbacks to previous point (in time) have been observed. Scale of salinity is not adapting according to psu.

R/V SOCIB: change the 4 “office-chairs” in the lab.

COMPUTING & IT: problems with the program teamviewer and licenses for remote connection. Options, install VNC Viewer on the PCs for remote connection?

Scientific Reports

Physical data report

The following contains an overview of the physical data collected from the CTD.

CTD and water bottle sampling

Data acquisition: CTD casts were carried out at 28 stations encompassing 1 transects across t the MC and 2 transects in the IC. At each station, water samples were collected with the rosette at various depths for measuring *in situ* salinity, dissolved oxygen and fluorescence in order to apply corrections to the conductivity, oxygen and fluorescence sensors. Refer to the available logbook generated during the cruise for more details on

sampling depths, replicates and parameters sampled at each station.

Data preprocessing and visualization: The sensor data were processed using SBE (Sea-Bird Electronics) Data Processing Version V7 23.2 (for details refer to SBE Web site). The resulting data are then processed in Matlab in order to provide the figures in the following section. Post cruise processing will involve the correction of the salinity data based on calibration with in situ water samples analysed in the lab with a Guildline Portasal model 8410A salinometer. The biogeochemical sampling will be discussed in the next section: the biogeochemical report.

Biogeochemical data report

As mentioned in the general objectives, the primary objective of the biogeochemical data collection during this cruise is to compare the CTD oxygen (SBE-43) and fluorescence (wetlabs) sensors against the *in situ* discrete water samples of these parameters.

Secondary field objectives are:

1. To estimate chl(*a)* concentration and distribution (as a proxy for phytoplankton biomass).

2. To study phytoplankton community composition.

Since the nitrate sensor SUV-51 was not available for this cruise, nutrient samples were not taken.

The sampling was carried out on 3 days from the 11th to the 13th February 2020 and followed the established R/V SOCIB protocols.

Dissolved oxygen

Discrete water samples (Winkler's method, Langdon 2010, see protocols) for comparison were taken at each station at a maximum of 3 depths. We chose depths of varying oxygen concentrations (in order to sample the full spectrum of oxygen concentrations). Refer to the available logbook generated during the cruise for more details on sampling depths, replicates and parameters sampled at each station.

Samples were analyzed on board after an 8-12 h period in darkness with a titration procedure with potentiometric endpoint detection (Metrohm 888 Titrator).

The final dissolved oxygen dataset will be produced post-cruise following the analysis of the

data.

Chl(*a*) concentration

Samples for chl *a* concentration were taken at all stations at 4 depths (see logbook for details). Post-cruise chl *a* determination will be carried out at the IMEDEA by fluorometry (Turner 10 AU fluorometer, see available protocol).

Phytoplankton community composition

Samples were taken on each station at the deep chlorophyll maximum (DCM, see logbook) for general cell identification (cells preserved in Lugol's solution, Utermöhl 1958). Samples for microscopy will be analyzed post-cruise at the IMEDEA.

Preliminary results

Preliminary physical results

1. Hydrography: Theta-S diagram

Figure 5, shows the potential temperature – salinity distribution of all stations of the entire water column, where colour indicates the longitude of the corresponding station.

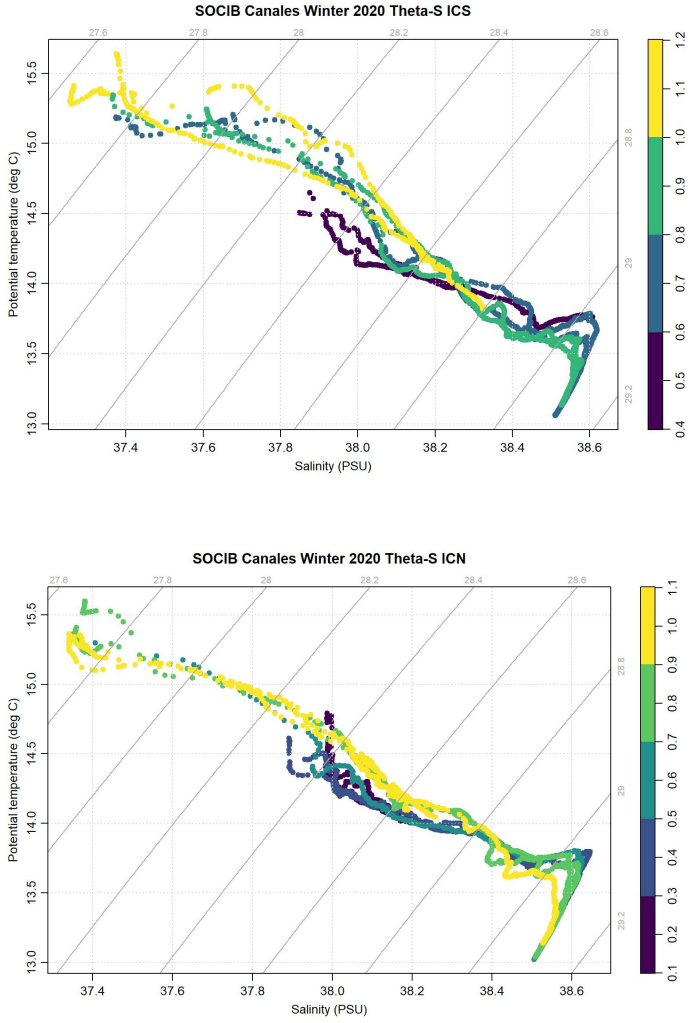


Fig 5a. T-S diagram of the stations sampled in the IC, (left ICS and right ICN) the colour bar indicates the longitude of the station; thus the colour spectrum from yellow to blue corresponds to the IC transect, from East to West

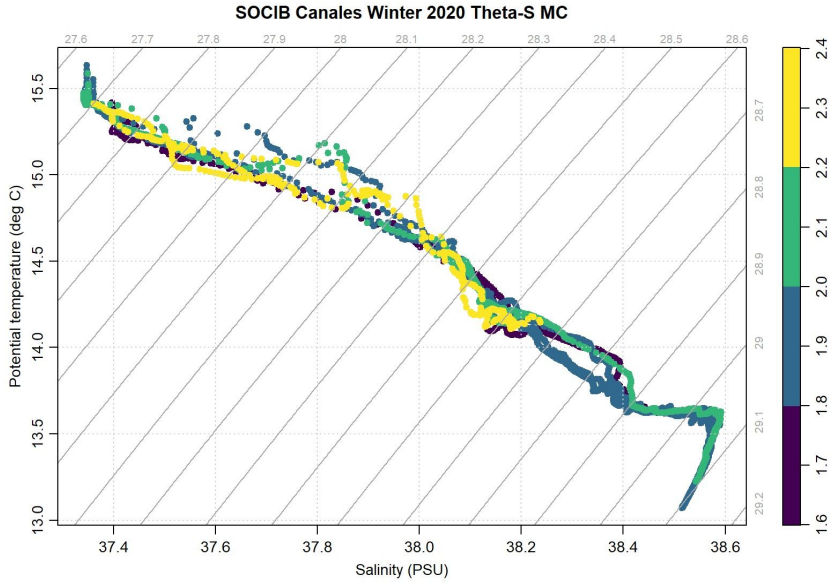


Fig 5b. T-S diagram of all MC stations; the colour bar indicates the longitude of the station; thus the colour spectrum from yellow to blue corresponds to the MC transect, from East to West.

2. Ibiza Channel: North

The figures presented in this section are showing the most northerly transect of the IC. Figure 6 shows the velocities u and v from the ADCP and their respective quality flags.

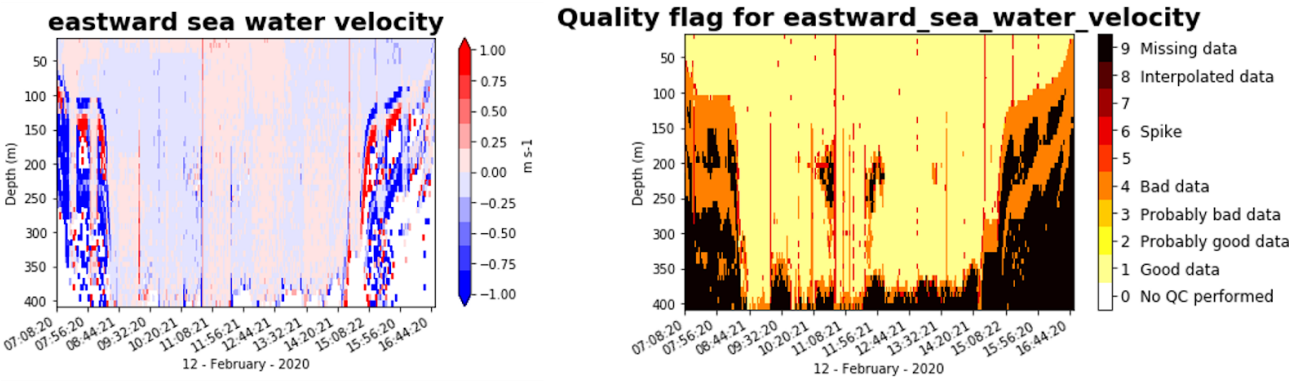


Fig. 6a. East components of velocity (mm s^{-1}) and quality flag plotted over time in the northern section of the IC during day 2.

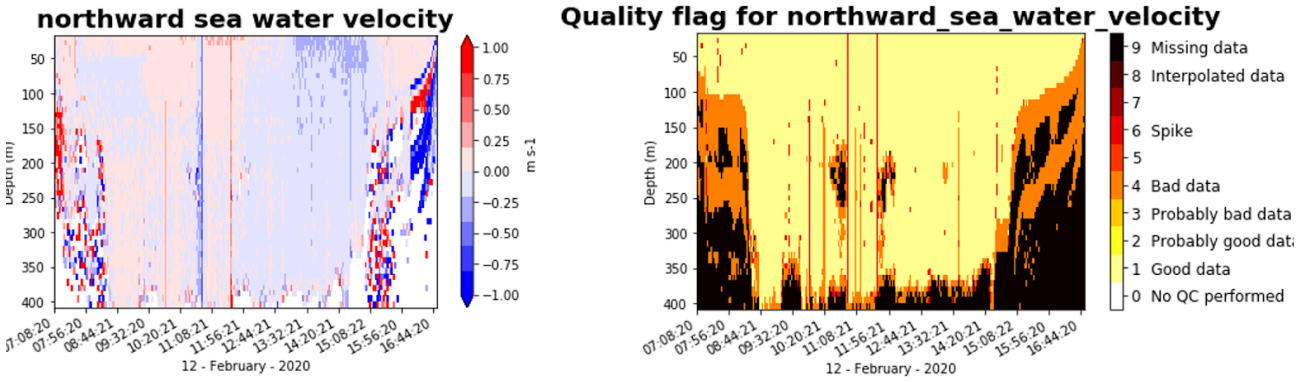


Fig. 6b. North components of velocity (mm s^{-1}) and quality flag plotted over time in the northern section of the IC during day 2

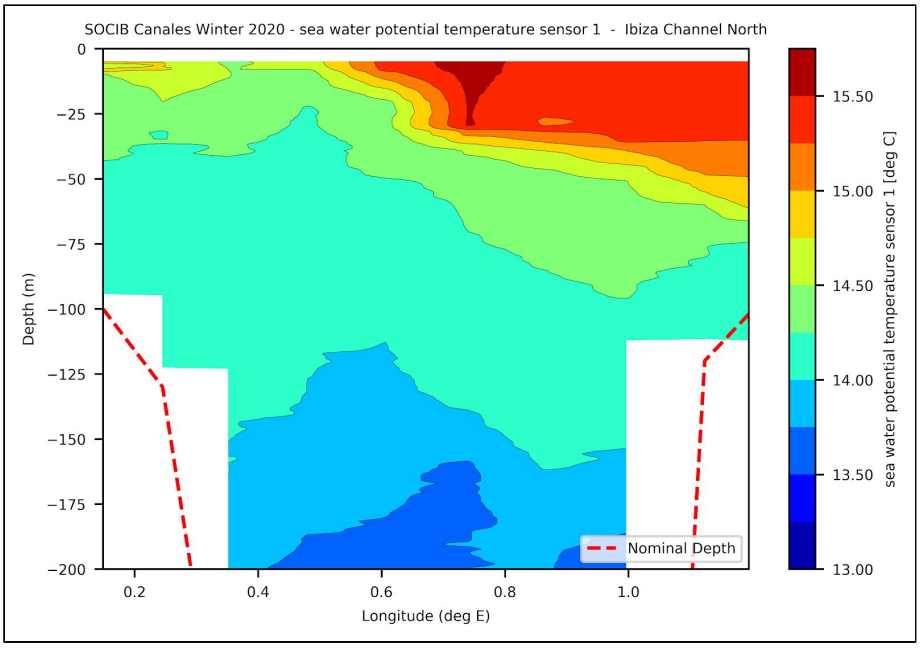


Fig. 7a. Potential Temperature (ºC) of the first (most northerly) transect of the IC (upper 200m section).

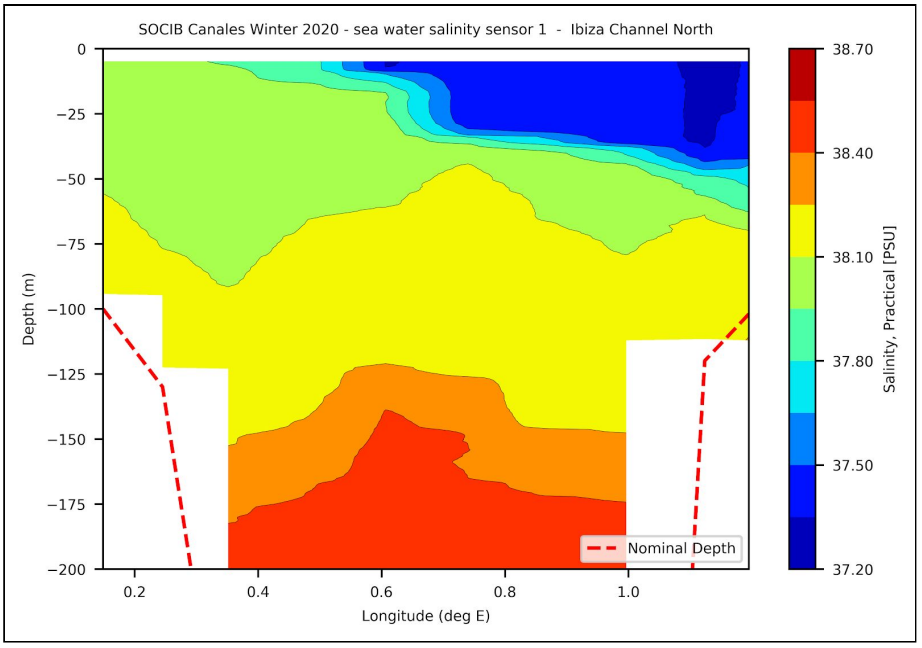


Fig. 7b. Salinity of the first (most northerly) transect of the IC (upper 200m section).

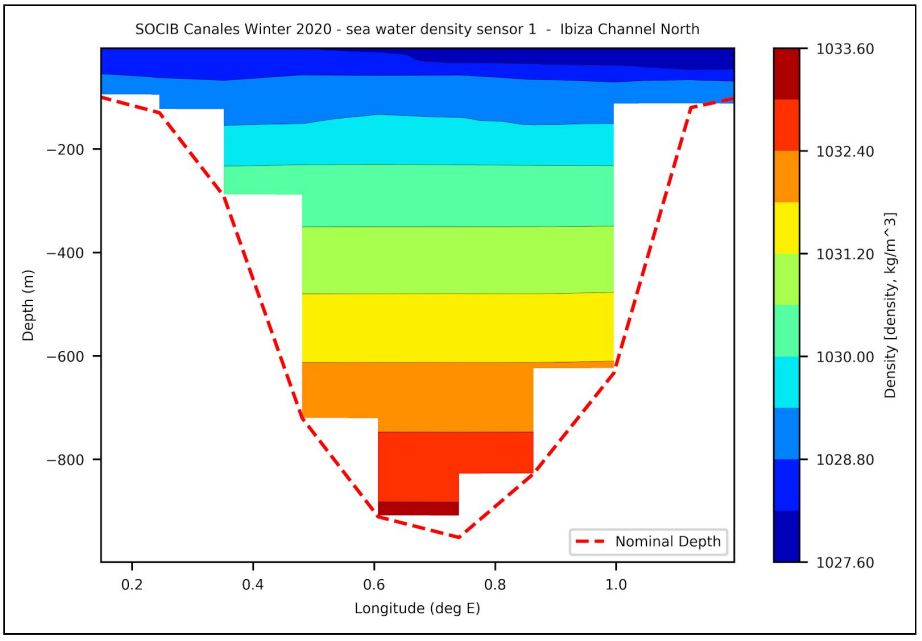


Fig. 7c. Density (kg m^{-3}) of the first (most northerly) transect of the IC.

3. Ibiza Channel: South

The figures presented in this section are showing the southern transect of the IC and the return transect of the MC. Figure 8 shows the velocities u and v from the ADCP and their respective quality flags.

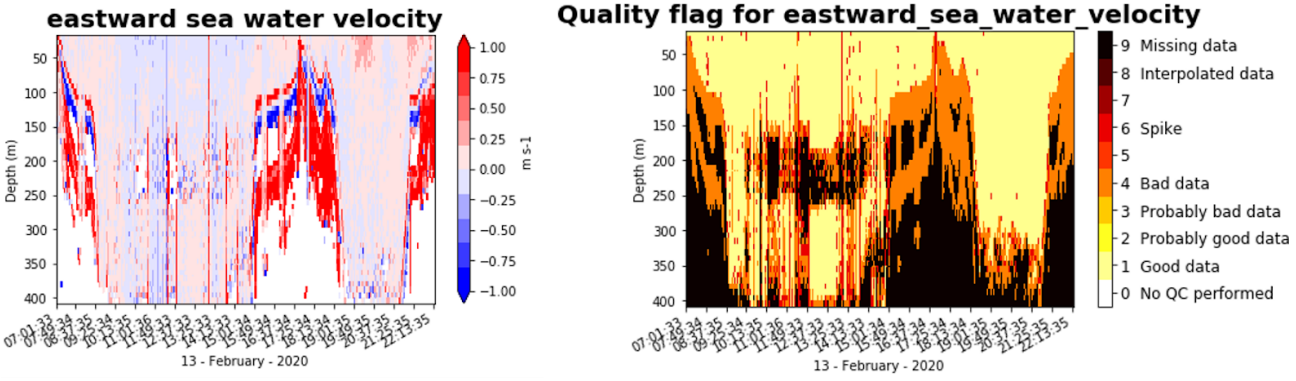


Fig. 8a. East components of velocity (mm s^{-1}) and quality flag plotted over time in the southern section of the IC and MC return transect during day 3.

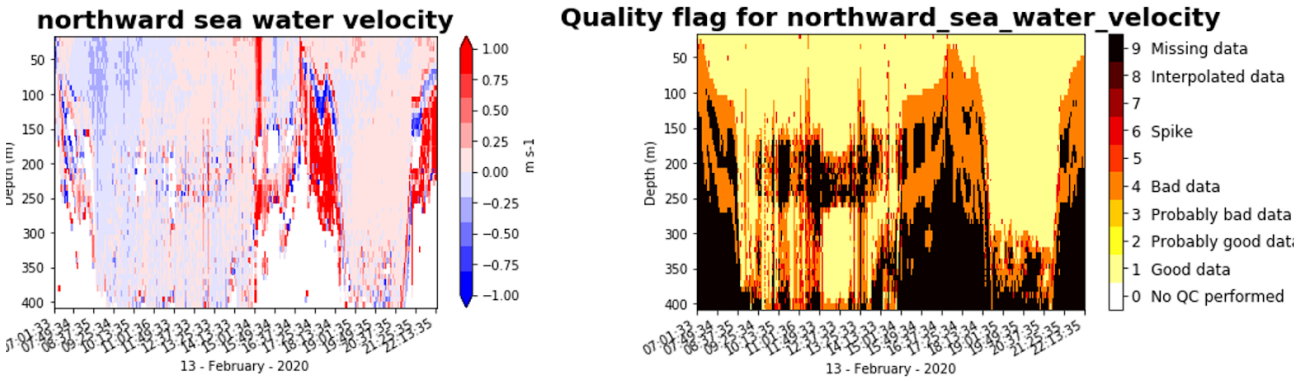


Fig. 8b. North components of velocity (mm s^{-1}) and quality flag plotted over time in the southern section of the IC and MC return transect during day 3.

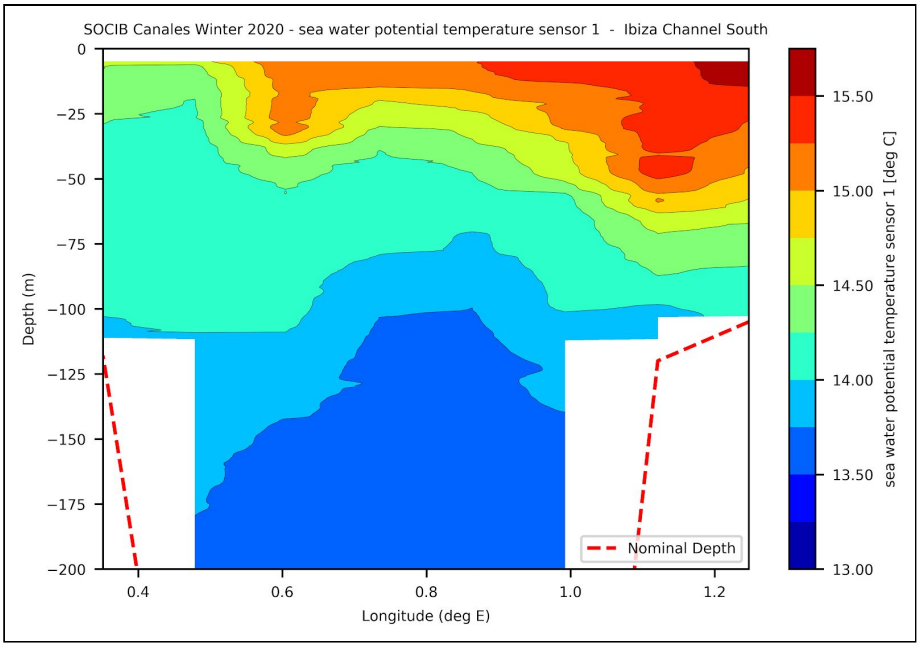


Fig. 9a. Potential temperature (ºC) of the southernmost IC cross-section (upper 200m section).

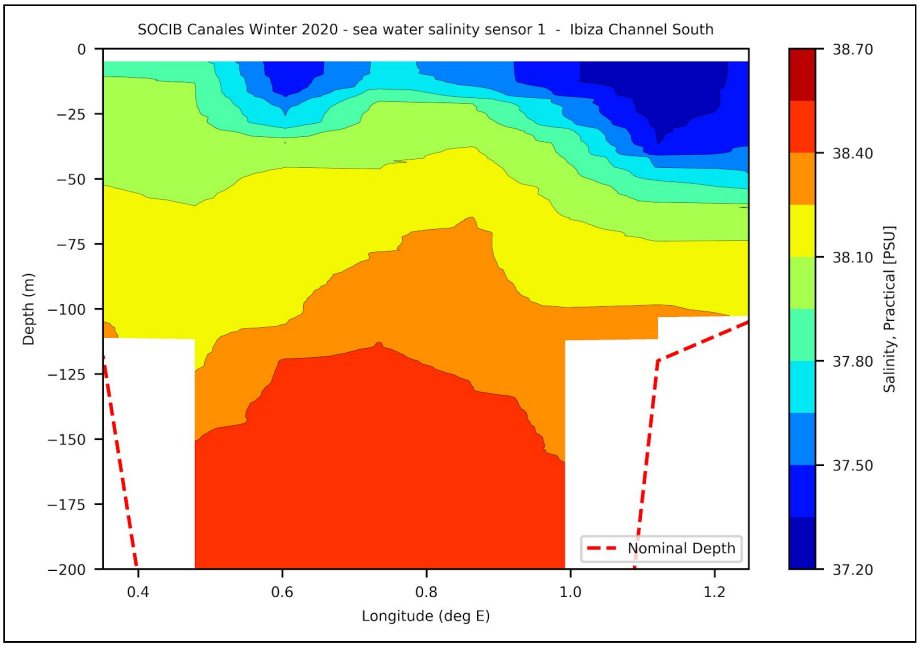


Fig. 9b. Salinity of the southernmost IC cross-section (upper 200m section).

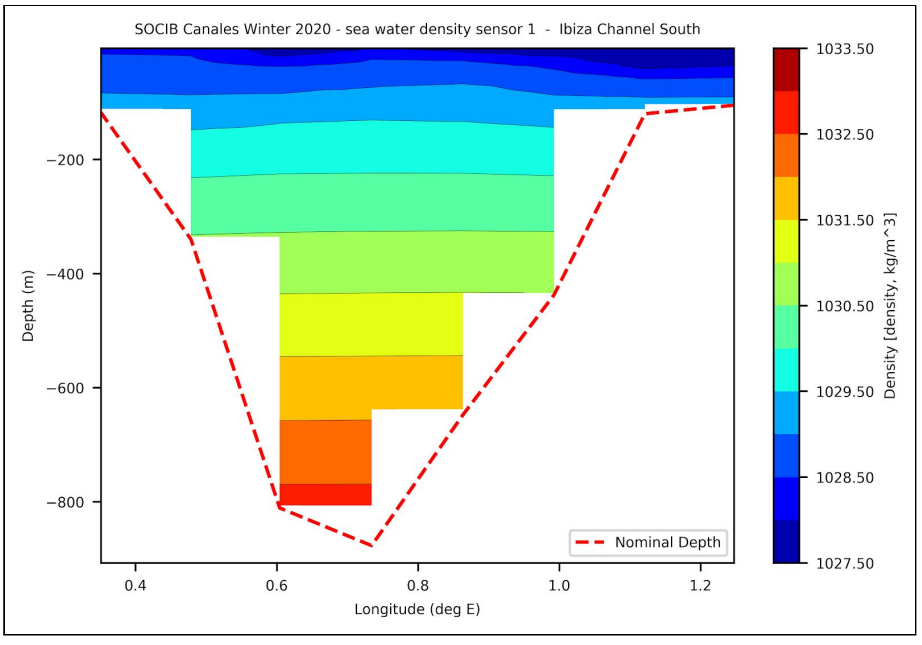


Fig. 9c. Density (kg m^{-3}) of the southernmost IC cross-section.

4. Mallorca Channel

The figures presented in this section are showing the transect of the MC. Figure 10 shows the velocities u and v from the ADCP and their respective quality flags.

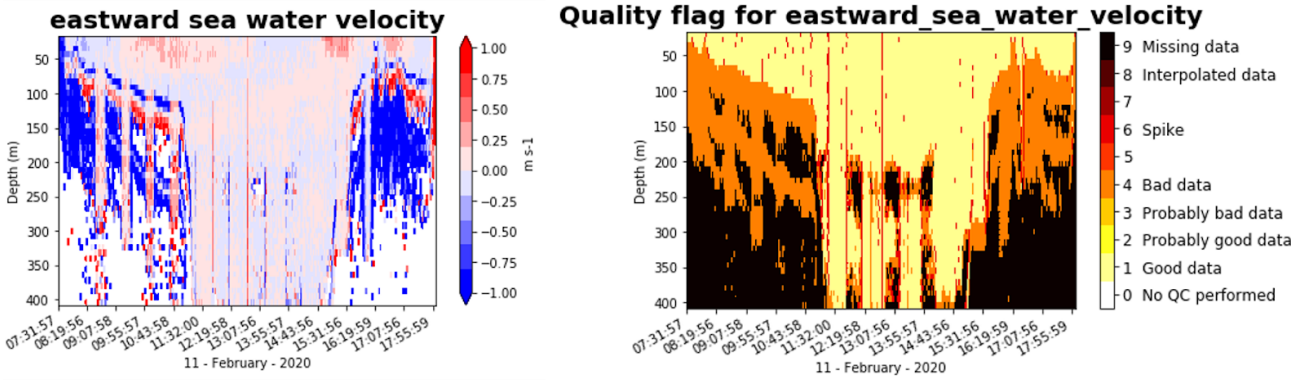


Fig.10a. East components of velocity (mm s^{-1}) and quality flag plotted over time in the MC section during day 1.

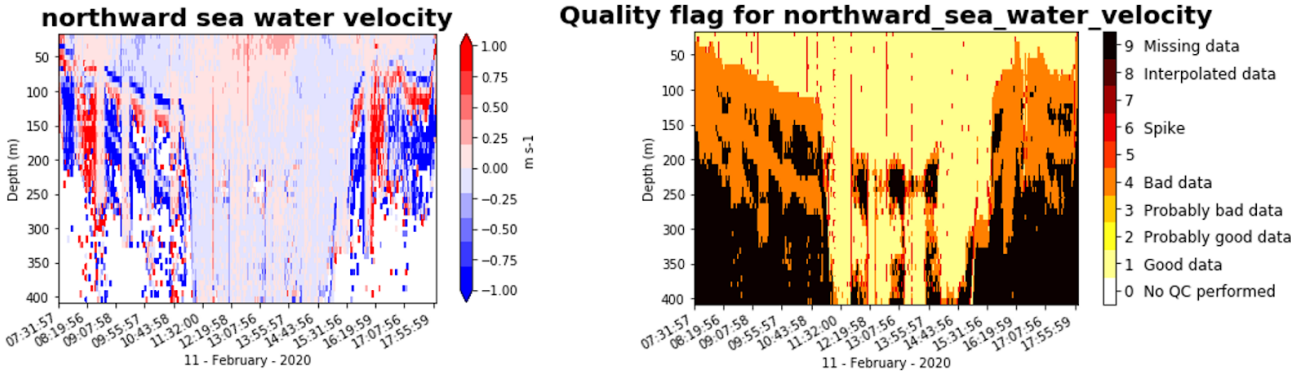


Fig. 10b. North components of velocity (mm s^{-1}) and quality flag plotted over time in the MC section during day 1.

The figures presented in this section are showing the transect of the MC.

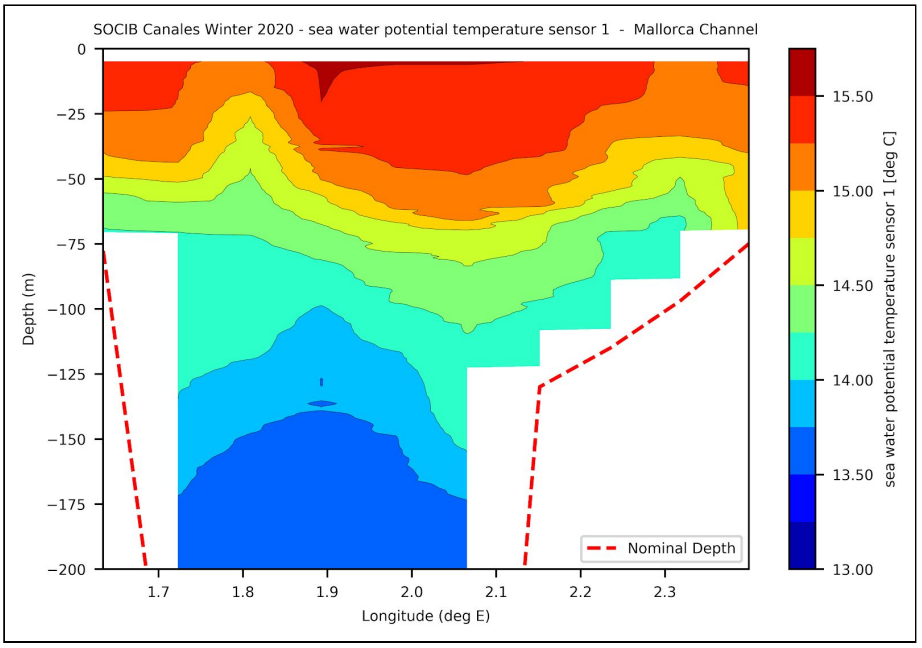


Fig. 11a. Temperature (ºC) of the MC cross-section (upper 200 m section).

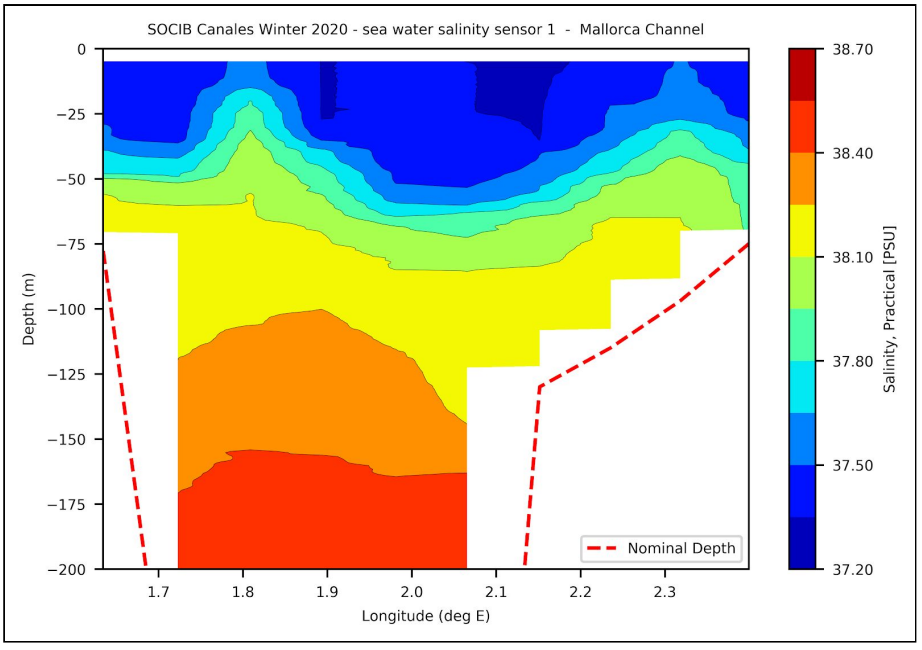


Fig. 11b. Salinity of the MC cross-section (upper 200 m section).

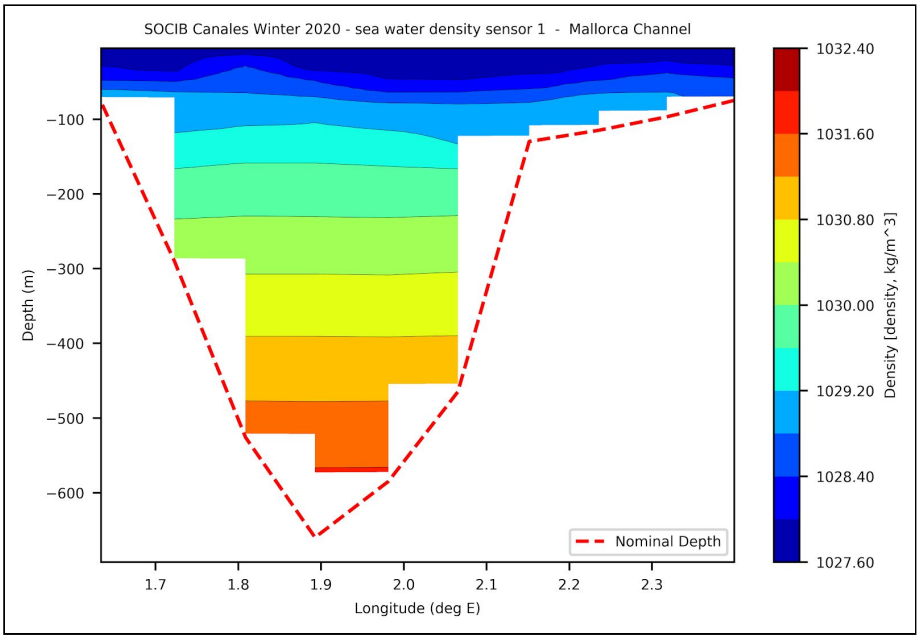


Fig. 11c. Density (kg m^{-3}) of the MC cross-section.

Preliminary biogeochemical results

The final biogeochemical dataset will be produced in due course following post-cruise analysis of the data.

1. Ibiza Channel: North

Below we present some preliminary results obtained with the CTD sensors for dissolved oxygen (Fig. 12a) and *in vivo* fluorescence (Fig. 12b) of northernmost transect of the IC. The chlorophyll fluorescence maximum depth follows the temperature horizontal gradient shown in Fig. 7a with maximum values at depths ≤ 50 m towards the Ibiza shelf (and what seems two peaks) and shallower (< 30 m) towards the peninsula shelf. The dissolved oxygen distribution follows hydrography as well with the maximum values (8 mg l^{-1}) encountered in the surface waters and also related to less saline waters (37.20 to 37.80).

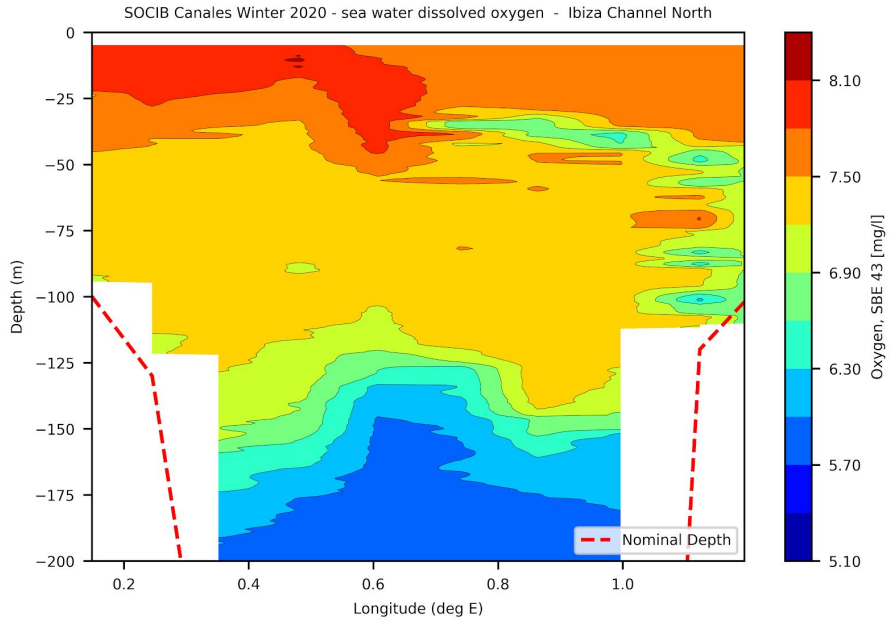


Fig. 12a: Initial figure for dissolved oxygen distribution obtained during the northern transect of the IC (upper 200 m)

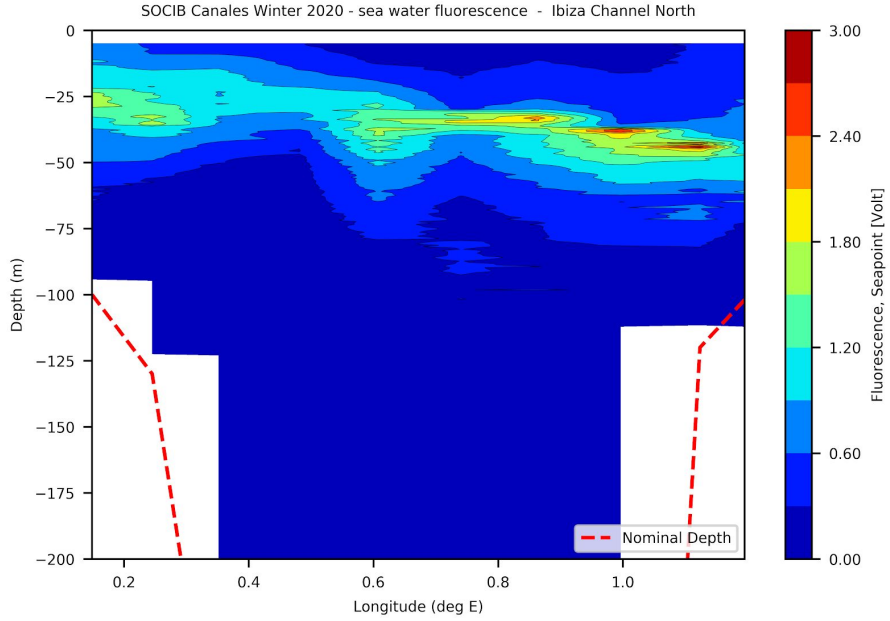


Fig. 12b: Initial figure for fluorescence distribution obtained during the northern transect of the IC (upper 200 m section).

2. Ibiza Channel: South

In this most southern transect of the Ibiza Channel we found the maximum chl *a* fluorescence signal (3 mg/m^3) at around 25 m, together with the highest values for dissolved oxygen (see Figs. 13 a, b).

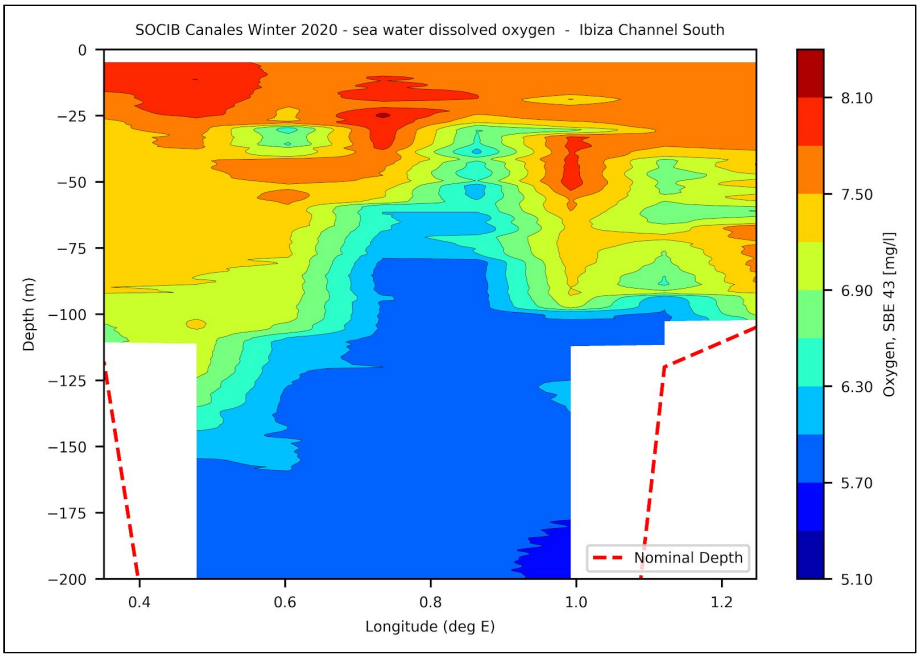


Fig. 13a: Initial figure for dissolved oxygen concentration distribution obtained on the southernmost IC cross-section (upper 200m).

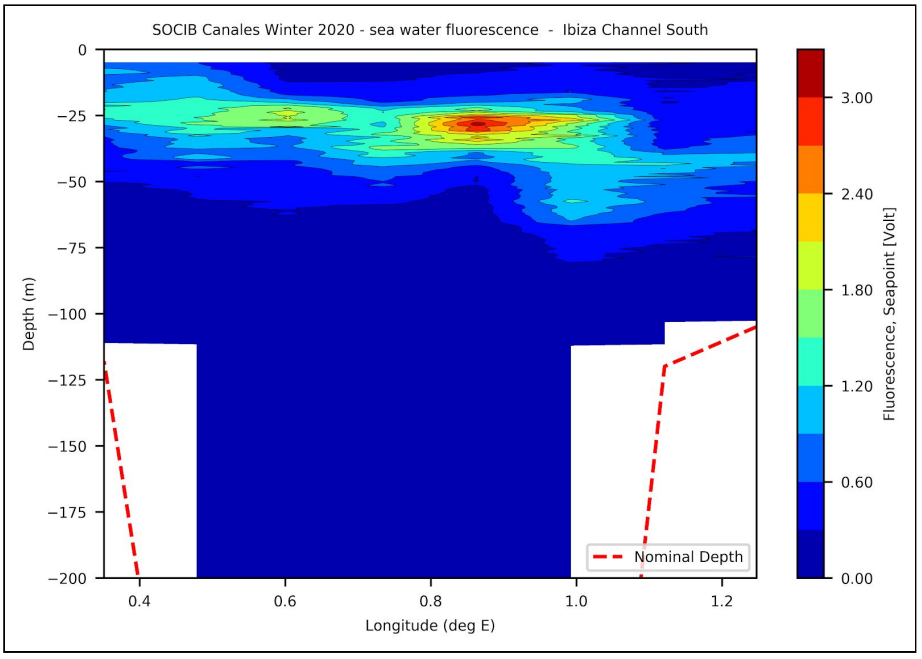


Fig. 13b: Initial figure for fluorescence distribution obtained on the the southernmost IC cross-section (upper 200 m)

3. Mallorca Channel

Below we present some preliminary results obtained with the CTD sensors for dissolved oxygen (Fig. 14a) and *in vivo* fluorescence (Fig. 14b). The chlorophyll fluorescence maximum depth is present at around 25 and 50 m. This distribution relates to the maximum values encountered for dissolved oxygen (> 7 mg/l). These preliminary results show higher fluorescence related to the shelves.

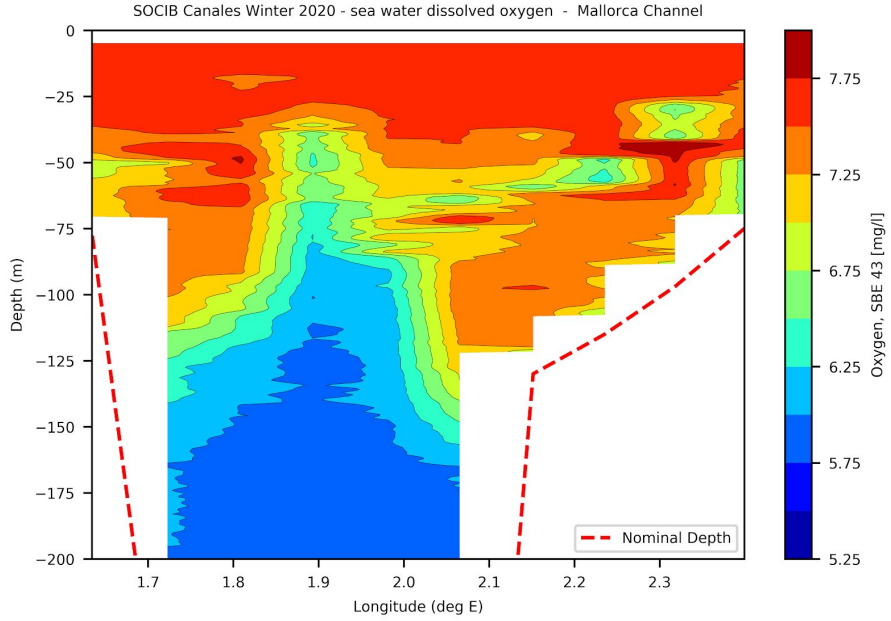


Fig. 14a: Initial figure for dissolved oxygen concentration distribution obtained on the Mallorca Channel cross-section (upper 200m).

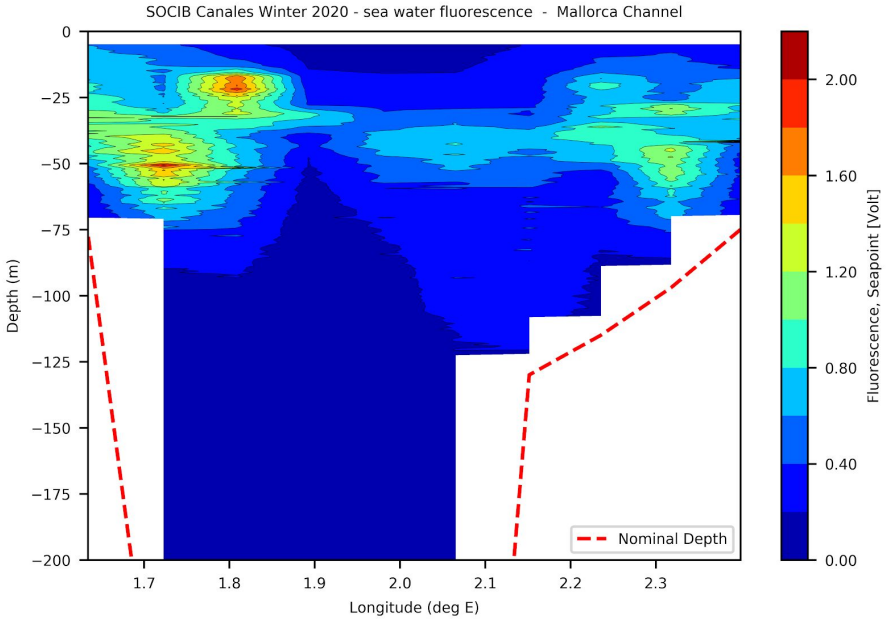


Fig. 14b: Initial figure for fluorescence distribution obtained on the the Mallorca Channel cross-section (upper 200m)

Preliminary results from the Lagrangian platforms

During the Canales Winter 2020, 2 SVP-B (surface drifters SVP with a barometer sensor) have been launched (13/02/2020) as part of the Global Drifter Program (NOAA, USA). Sea surface temperature and air pressure are shown in Figures 15a and 15b, respectively.

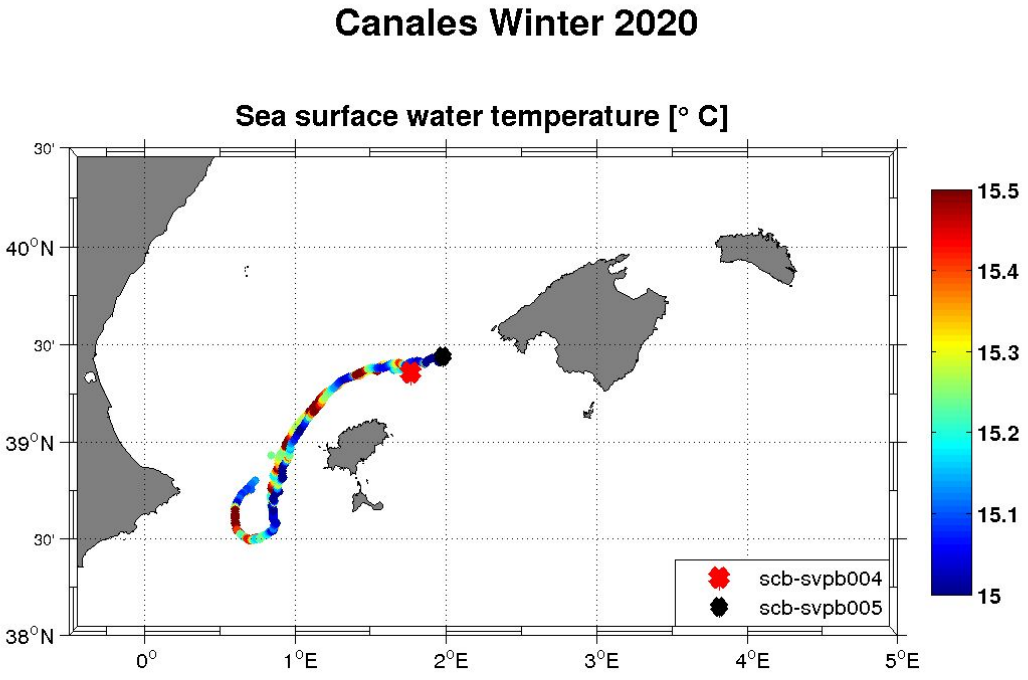


Fig 15a. Sea surface water temperature measured by the SVP-B's (with barometer sensor). Period represented: 13/02/2020-27/02/2020

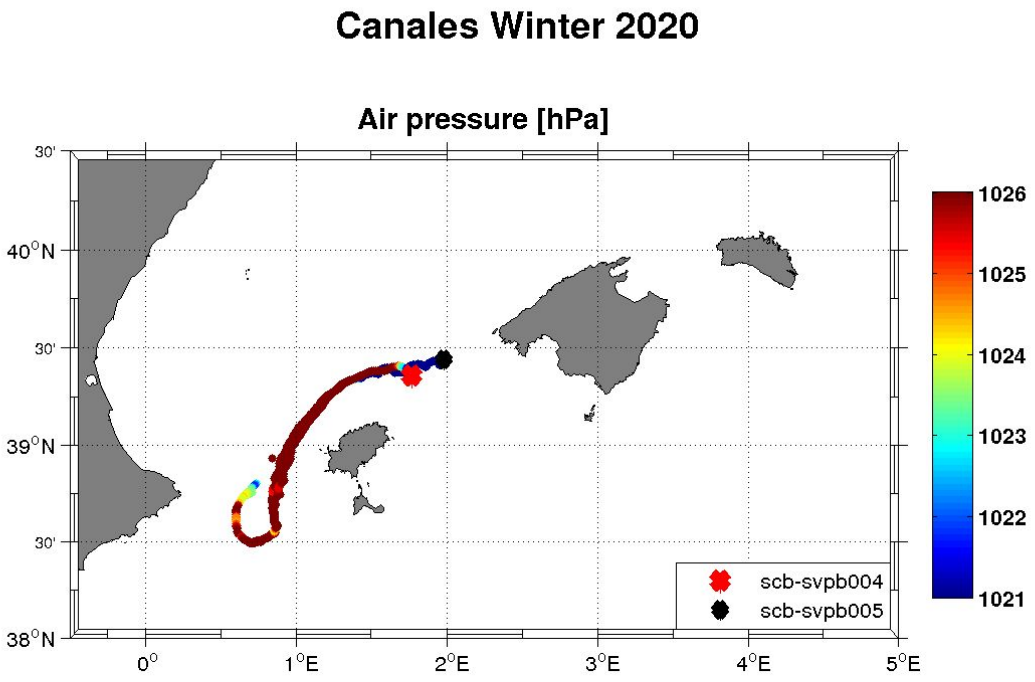


Fig 15b. Air pressure measured by SVP-B's (with barometer sensor). Period represented: 13/02/2020-27/02/2020

Problems encountered

Seadatanet Cruise Summary Report Link

The SDN-ICES Cruise Summary Report that references to this cruise is available through the following link:

CSR Source	URL
BSH Ref-No.: 20203043	http://seadata.bsh.de/Cgi-csr/retrieve_sdn2/csrreport.pl?project=SDN&session=70168&v1=10&v2=1&pcode=

Processed Data Repository

Data Source	Thredds URL
Position	http://thredds.socib.es/thredds/catalog/research_vessel/gps/socib_rv-scb_pos001/L1/2020/02/catalog.html?dataset=research_vessel/gps/socib_rv-scb_pos001/L1/2020/02/dep0064_socib-rv_scb-pos001_L1_2020-02-11.nc
Thermosal	http://thredds.socib.es/thredds/catalog/research_vessel/thermosalinometer/socib_rv-scb_tsl001/L1/2020/02/catalog.html?dataset=research_vessel/thermosalinometer/socib_rv-scb_tsl001/L1/2020/02/dep0060_socib-rv_scb-tsl001_L1_2020-02-11.nc
Weather Station	http://thredds.socib.es/thredds/catalog/research_vessel/weather_station/socib_rv-scb_met009/L1/2020/02/catalog.html?dataset=research_vessel/weather_station/socib_rv-scb_met009/L1/2020/02/dep0061_socib-rv_scb-met009_L1_2020-02-11.nc
CTD	http://thredds.socib.es/thredds/catalog/research_vessel/ctd/socib_rv-scb_sbe9001/L1/2020/catalog.html?dataset=research_vessel/ctd/socib_rv-scb_sbe9001/L1/2020/dep0019_socib-rv_scb-sbe9001_L1_2020-02-11_data_dt.nc
VM-ADCP	http://thredds.socib.es/thredds/catalog/research_vessel/current_profiler/socib_rv-scb_rdi001/L1/2020/catalog.html?dataset=research_vessel/current_profiler/socib_rv-scb_rdi001/L1/2020/dep0029_socib-rv_scb-rdi001_L1_2020-02_data_dt.nc
SCB-SVPB004	http://thredds.socib.es/thredds/dodsC/drifter/surface_drifter/drifter_svpb004-scb_svpb004/L1/2020/dep0001_drifter-svpb004_scb-svpb004_L1_2020-02-13.nc
SCB-SVPB005	http://thredds.socib.es/thredds/dodsC/drifter/surface_drifter/drifter_svpb005-scb_svpb005/L1/2020/dep0001_drifter-svpb005_scb-svpb005_L1_2020-02-13.nc

Instrumentation description and configuration

In this section are described the instrumentation and the configuration used during the cruise

CTD-Probe

Manufacturer:	SeaBird
Model:	SBE9+
S/N:	1023
SOCIB Inventory:	SCB-SBE9001
Deck Unit:	SBE11
SOCIB Inventory:	SCB-SBE11001

Sensor	Model	S/N	Calibration date
Temperature	SBE 3P	03P5391	31/10/2018
Temperature 2	SBE 3P	03P5425	31/10/2018
Conductivity	SBE4C	043718	27/09/2018
Conductivity 2	SBE4C	043907	18/10/2018
Pressure		1023	28/09/2018

Oxygen	SBE 43	2119	19/10/2018
Transmissometer	WET Labs C-Star 25-650	CST-1419DR	16/11/2018
Turbidity	STM Sea Point	12182	07/11/2018
Fluorometer	Seapoint 6000m	3259	07/11/2018
Irradiance	PAR Biospherical QCP-2300L-HP	70364	02/11/2018
Surface Irradiance	SPAR Superficie Biospherical QSR2200	20519	02/11/2018
Altimeter	Datasonics PSA-916D	69894	12/2018

Configuration

For controlling the CTD the following file was used:

- RADMED_01.xmlcon.

Thermo-salinometer

Manufacturer:	SeaBird
Model:	SBE21
S/N:	3370
SOCIB Inventory:	SCB-TSL001
Calibration date:	2018/07/03

Configuration

The data were collected using the NEREIDAS system and acquisition backup was performed using seasave software. The data were stored directly in the vessel server and processed processed through the SOCIB-DC system.

Weather Station

Manufacturer:	Geonica
Model:	Meteodata 2000
S/N:	
SOCIB Inventory:	SCB-MET009
Calibration date:	2011

Configuration

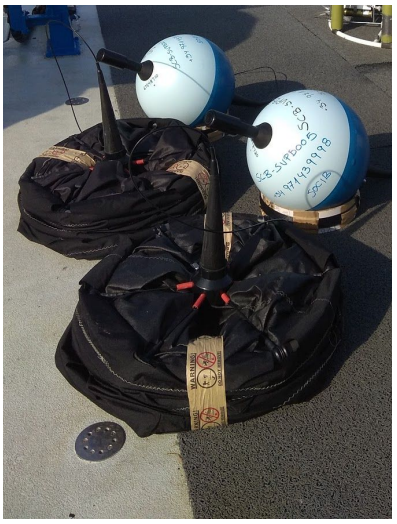
The data were collected using the NEREIDAS System. The data were stored directly in the vessel server and processed through the SOCIB-DC system.

Acoustic doppler profiler

Manufacturer:	RDI
Model:	Ocean Surveyor 150 kHz
S/N:	1878
SOCIB Inventory:	SCB-RDi001

SVP and SVP-B Surface Drifters

Manufacturer:	Data Buoy Instrumentation, LLC (DBi)
Model:	SVP-B
IMEI / WMO:	300234067548710/6202688 300234067548720/6202689
SOCIB Inventory:	SCB-SVPB004 SCB-SVPB005
Calibration date:	Testing SCB-SVPB004 Testing SCB-SVPB005



References

Langdon C. (2010). Determination of dissolved oxygen in seawater by Winkler titration using the amperometric technique. In: Sloyan B.M., Sabine C. (Eds). GO–SHIP repeat hydrography manual: A Collection of Expert Reports and guidelines. IOC/IOCCP. Paris.

Utermöhl H. (1958). Zur Vervollkomnung der quantitativen Phytoplankton-Methodik. Mitteilungen der internationale Vereinigung für theorische und angewandte Limnologie 9:1–38.

APPENDIX 1: Activities through Canales Winter2020

For a table of all ship activities logged during the campaign, refer to the excel file, SHIP_LOGBOOK.

APPENDIX 2: CTD configuration files in Canales Winter2020

RADMED_01.XMLCON

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<?xml version="1.0" encoding="UTF-8"?>
<SBE_InstrumentConfiguration SB_ConfigCTD_FileVersion="7.23.0.2" >
  <Instrument Type="8" >
    <Name>SBE 911plus/917plus CTD</Name>
    <FrequencyChannelsSuppressed>0</FrequencyChannelsSuppressed>
    <VoltageWordsSuppressed>0</VoltageWordsSuppressed>
    <ComputerInterface>0</ComputerInterface>
    <!-- 0 == SBE11plus Firmware Version >= 5.0 -->
    <!-- 1 == SBE11plus Firmware Version < 5.0 -->
    <!-- 2 == SBE 17plus SEARAM -->
```

```
<!-- 3 == None -->
<DeckUnitVersion>0</DeckUnitVersion>
<ScansToAverage>1</ScansToAverage>
<SurfaceParVoltageAdded>1</SurfaceParVoltageAdded>
<ScanTimeAdded>0</ScanTimeAdded>
<NmeaPositionDataAdded>1</NmeaPositionDataAdded>
<NmeaDepthDataAdded>0</NmeaDepthDataAdded>
<NmeaTimeAdded>0</NmeaTimeAdded>
<NmeaDeviceConnectedToPC>0</NmeaDeviceConnectedToPC>
<SensorArray Size="15" >
  <Sensor index="0" SensorID="55" >
    <TemperatureSensor SensorID="55" >
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      <CalibrationDate>31-Oct-18</CalibrationDate>
      <UseG_J>1</UseG_J>
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      <B>0.00000000e+000</B>
      <C>0.00000000e+000</C>
      <D>0.00000000e+000</D>
      <F0_Old>0.000</F0_Old>
      <G>4.33142500e-003</G>
      <H>6.26486476e-004</H>
      <I>1.94602726e-005</I>
      <J>1.42591432e-006</J>
      <F0>1000.000</F0>
      <Slope>1.00000000</Slope>
      <Offset>0.0000</Offset>
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  </Sensor>
  <Sensor index="1" SensorID="3" >
    <ConductivitySensor SensorID="3" >
      <SerialNumber>3718</SerialNumber>
      <CalibrationDate>27-Sep-18</CalibrationDate>
      <UseG_J>1</UseG_J>
      <!-- Cell const and series R are applicable only for wide range sensors. -->
      <SeriesR>0.0000</SeriesR>
      <CellConst>2000.0000</CellConst>
      <ConductivityType>0</ConductivityType>
      <Coefficients equation="0" >
        <A>0.00000000e+000</A>
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        <C>0.00000000e+000</C>
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      <M>0.0</M>
      <CPcor>-9.57000000e-008</CPcor>
    </Coefficients>
    <Coefficients equation="1" >
      <G>-1.00651454e+001</G>
      <H>1.34538336e+000</H>
      <I>-2.21364165e-003</I>
      <J>2.13478237e-004</J>
      <CPcor>-9.57000000e-008</CPcor>
      <CTcor>3.2500e-006</CTcor>
      <!-- WBOTC not applicable unless ConductivityType = 1. -->
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    </Coefficients>
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    <Offset>0.00000</Offset>
  </ConductivitySensor>
</Sensor>
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  <PressureSensor SensorID="45" >
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    <CalibrationDate>28-Sep-18</CalibrationDate>
    <C1>-4.979972e+004</C1>
    <C2>7.716754e-001</C2>
    <C3>1.594560e-002</C3>
    <D1>3.855600e-002</D1>
    <D2>0.000000e+000</D2>
    <T1>3.000011e+001</T1>
    <T2>-5.335740e-005</T2>
    <T3>4.057330e-006</T3>
    <T4>3.751370e-009</T4>
    <Slope>0.99998358</Slope>
    <Offset>-2.28428</Offset>
    <T5>0.000000e+000</T5>
    <AD590M>1.282500e-002</AD590M>
    <AD590B>-9.474780e+000</AD590B>
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    <CalibrationDate>31-Oct-18</CalibrationDate>
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      <C>0.00000000e+000</C>
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      <H>6.26530273e-004</H>
      <I>1.95901261e-005</I>
      <J>1.48494602e-006</J>
      <F0>1000.000</F0>
      <Slope>1.00000000</Slope>
      <Offset>0.0000</Offset>
    </TemperatureSensor>
  </Sensor>
  <Sensor index="4" SensorID="3" >
    <ConductivitySensor SensorID="3" >
      <SerialNumber>3907</SerialNumber>
      <CalibrationDate>17-Oct-18</CalibrationDate>
      <UseG_J>1</UseG_J>
      <!-- Cell const and series R are applicable only for wide range sensors. -->
      <SeriesR>0.0000</SeriesR>
      <CellConst>2000.0000</CellConst>
      <ConductivityType>0</ConductivityType>
      <Coefficients equation="0" >
        <A>0.00000000e+000</A>
        <B>0.00000000e+000</B>
        <C>0.00000000e+000</C>
        <D>0.00000000e+000</D>
        <M>0.0</M>
        <CPcor>-9.57000000e-008</CPcor>
      </Coefficients>
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        <H>1.39010276e+000</H>
        <I>2.66199600e-005</I>
        <J>7.95984096e-005</J>
        <CPcor>-9.57000000e-008</CPcor>
        <CTcor>3.2500e-006</CTcor>
        <!-- WBOTC not applicable unless ConductivityType = 1. -->
        <WBOTC>0.00000000e+000</WBOTC>
      </Coefficients>
      <Slope>1.00000000</Slope>
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  </ConductivitySensor>
</Sensor>
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  <WET_LabsCStar SensorID="71" >
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    <CalibrationDate>16-Nov-18</CalibrationDate>
    <M>21.6970</M>
    <B>-1.7140</B>
    <PathLength>0.250</PathLength>
  </WET_LabsCStar>
</Sensor>
<Sensor index="6" SensorID="27" >
  <NotInUse SensorID="27" >
    <SerialNumber></SerialNumber>
    <CalibrationDate></CalibrationDate>
    <OutputType>2</OutputType>
    <Free>1</Free>
  </NotInUse>
</Sensor>
<Sensor index="7" SensorID="38" >
  <OxygenSensor SensorID="38" >
    <SerialNumber>2119</SerialNumber>
    <CalibrationDate>19-Oct-18</CalibrationDate>
    <Use2007Equation>1</Use2007Equation>
    <CalibrationCoefficients equation="0" >
      <!-- Coefficients for Owens-Millard equation. -->
      <Boc>0.0000</Boc>
      <Soc>0.0000e+000</Soc>
      <offset>0.0000</offset>
      <Pcor>0.00e+000</Pcor>
      <Tcor>0.0000</Tcor>
      <Tau>0.0</Tau>
    </CalibrationCoefficients>
    <CalibrationCoefficients equation="1" >
      <!-- Coefficients for Sea-Bird equation - SBE calibration in 2007 and later. -->
      <Soc>4.6176e-001</Soc>
      <offset>-0.4789</offset>
      <A>-4.7676e-003</A>
      <B> 2.1219e-004</B>
      <C>-2.9939e-006</C>
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      <D2>-4.64803e-002</D2>
      <E> 3.6000e-002</E>
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    <Free>1</Free>
  </NotInUse>
</Sensor>
<Sensor index="9" SensorID="33" >
  <OBS_SeapointTurbiditySensor SensorID="33" >
    <SerialNumber>12182</SerialNumber>
    <CalibrationDate>07-Nov-18</CalibrationDate>
    <!-- The following is an array index, not the actual gain setting. -->
    <GainSetting>0</GainSetting>
    <ScaleFactor>1.000</ScaleFactor>
  </OBS_SeapointTurbiditySensor>
</Sensor>
<Sensor index="10" SensorID="11" >
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    <SerialNumber>3259</SerialNumber>
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    <!-- The following is an array index, not the actual gain setting. -->
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<Sensor index="11" SensorID="0" >
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