

The BOUSSOLE project technical reports; report # 10-229, issue 1.

BOUSSOLE Monthly Cruise Report

Cruise 246

September 09-11, 2022

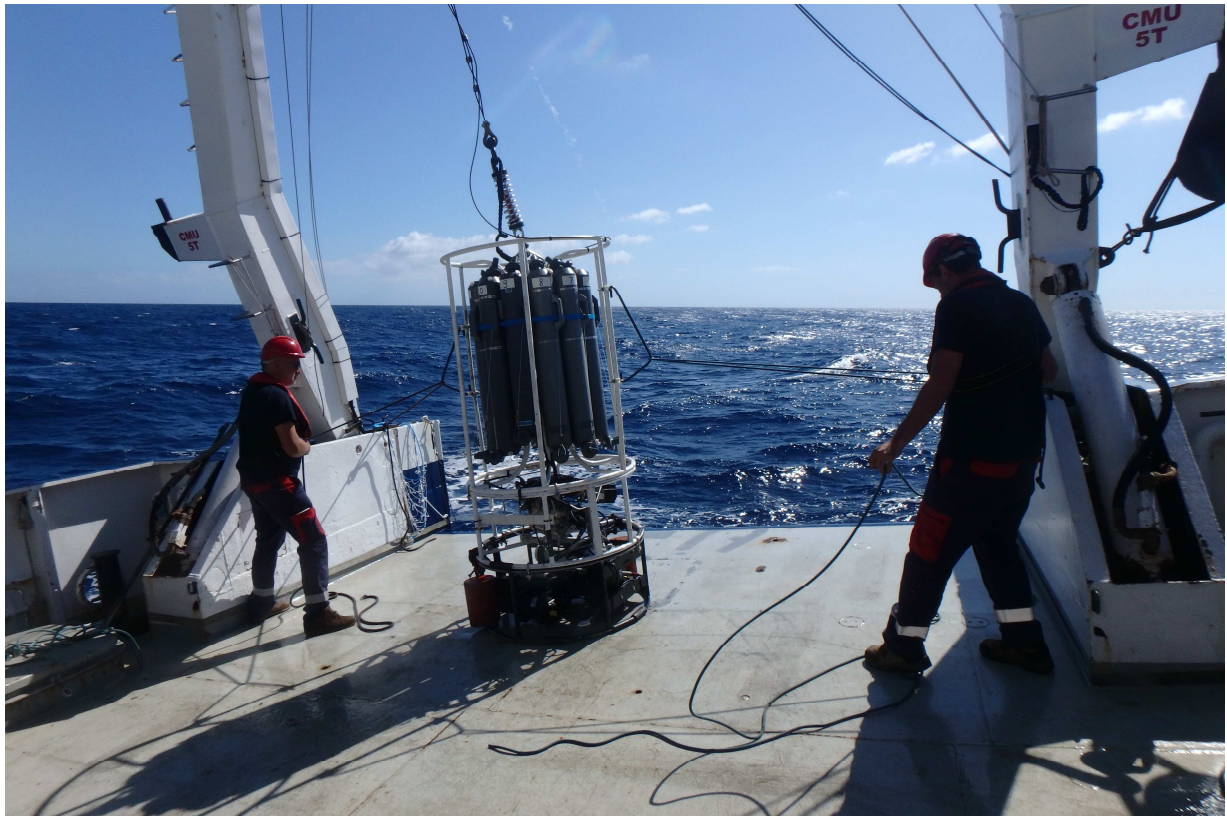
Duty Chief: Melek Golbol (melek.golbol@imev-mer.fr)

Vessel: R/V Téthys II

(Captain: Dany Deneuve)

Science Personnel: Ewen Ancel, Céline Dimier and Melek Golbol

Institut de la Mer de Villefranche (IMEV), 06230 Villefranche-sur-Mer, France



Deployment of the CTD Rosette from the deck of the R/V Téthys II at the BOUSSOLE site.

BOUSSOLE project

ESA/ESRIN contract N° 4000119096/17/I-BG

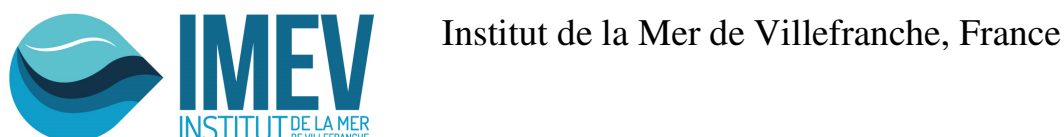
September 29, 2022



Foreword

This report is part of the technical report series that is being established by the BOUSSOLE project.

BOUSSOLE is funded and supported by the following Agencies and Institutions



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Cruise Objectives

Routine operations

Multiple Biospherical's C-OPS (Compact Optical Profiling System) radiometric profiles are performed at the BOUSSOLE site around solar noon, under optimal conditions: clear blue skies and flat, calm sea surface. If the sky is clear and sea conditions are reasonably calm (no whitecaps or large swell), handheld CIMEL sun photometer measurements are to be performed consecutively where possible with C-OPS profiles. If sea conditions are poor but sky is good, handheld CIMEL sun photometer measurements can be made at intervals throughout the day to measure atmospheric optical thickness. CTD deployments are required at the start and the end of the C-OPS profiling day and around noon in the longer summer days or when there is a high possibility of a satellite matchup. The CTD package also includes a Chl fluorometer. Additional instrumentation for measurement of inherent optical properties has been added from December 2011. The package includes a hyperspectral absorption meter (Hobilabs a-Sphere), a multispectral backscattering meter (Hobilabs Hydroscat-6) and a multispectral beam transmissometer (Hobilabs Gamma-4). A CTD cast including a 0.2 μm filter installed on the inlet tube of the a-Sphere is to be performed once per cruise at the BOUSSOLE site for the dissolved matter absorption measurements. This cast will be stopped at ten depths during 2 or 7 min depending on the depths in order to ensure that the integrating cavity of the a-Sphere be completely filled at each of these depths during the ascent of the CTD.

Seawater samples are to be collected, filtered and stored into liquid nitrogen for subsequent HPLC pigment and particle absorption spectrophotometric filter analysis in the lab. Three replicate samples are to be collected at surface for total suspended matter weighting in the lab.

Divers check the underwater state of the buoy structure and instrumentation, take pictures for archiving, clean the sensor optical surfaces, and then take again some pictures after cleaning. Divers also put a neoprene cap on the backscattering meter and on the transmissometers for acquiring dark measurements (started in April 2009).

Projects-specific operations

In addition, water samples are to be collected at 5 m depth for dissolved oxygen (DO), total alkalinity (TA) and total inorganic carbon (TC) analysis (from March 2014) and pH analysis (from October 2021). The TA/TC samples will be processed by the National service for such analyses (SNAPOCO – LOCEAN in Paris). The DO and pH samples will be analysed in the *Institut de la Mer de Villefranche* by the MOOSE team. The results will allow checking the data collected by the pCO₂ CARIOCA sensors, the optode and the pH sensor installed on the buoy at 3 m.

Water samples are to be collected at four depths for metagenomic analyses of different types of *Synechococcus*, cytometry and nutrients (from March 2020). Additional samples for cytometry analyses are to be collected at ten depths during the BOUSSOLE CTD sampling (from November 2021). These operations are part of the EFFICACY ANR project in collaboration with the *Roscoff Biological Station*. The aim is to study the distribution of different types of *Synechococcus* populations characterized by distinct pigmentation and adaptation to the colour of light. It includes two years of cytometry and metagenomic sampling at the BOUSSOLE site.

Further details about these operations and the data collection and processing protocols are to be found in: Antoine, D. M. Chami, H. Claustre, F. D'Ortenzio, A. Morel, G. Bécu, B. Gentili, F. Louis, J. Ras, E. Roussier, A.J. Scott, D. Tailliez, S. B. Hooker, P. Guevel, J.-F. Desté, C. Dempsey and D. Adams. 2006, BOUSSOLE: a joint CNRS-INSU, ESA, CNES and NASA Ocean Color Calibration And Validation Activity. NASA Technical memorandum N° 2006 - 214147, 61 pp.

(http://www.obs-vlfr.fr/Boussole/html/publications/pubs/BOUSSOLE_TM_214147.pdf)

Additional operations

A Manta net was deployed after BOUSSOLE operations for MOOSE program on the way back to the Nice harbour.

Sampling for metagenomic analyses, cytometry and nutrients were performed during two years until cruise #245 and therefore were not carried out on this cruise. These operations are part of the EFFICACY ANR project in collaboration with the *Roscoff Biological Station*.

Cruise Summary

Cruise was cancelled the first and second days because of the bad weather. However, it was possible to perform the BOUSSOLE operations the day after when the sea conditions became better. This day was used for CTD casts with water sampling, for C-OPS profiles and for a Secchi disk at the BOUSSOLE site. It was also used to perform a Manta horizontal net for MOOSE-DYFAMED program. Diving operations were not performed during this cruise because they were anticipated and performed on September 7th due to the bad weather forecasts.

Friday 09 September 2022

Bad weather prevented departure from the Nice harbour.

Saturday 10 September 2022

Bad weather prevented departure from the Nice harbour.

Sunday 11 September 2022

The sea state was slight with a gentle to moderate breeze. The sky was blue and the visibility was good. Firstly, a CTD cast with water sampling and 3 C-OPS profiles were performed at the BOUSSOLE site. Then a CTD with water sampling was performed with a cap put on the backscattering meter for dark measurements and a 0.2 μ m filter put on the a-Sphere absorption meter for the dissolved matter absorption measurements. This cast was stopped at 10 depths during the ascent of the CTD. In the meantime, a Secchi disk was performed. Finally, a Manta horizontal net was deployed during the way back to the Nice harbour.

Pictures taken during this cruise can be found at:

<https://photos.app.goo.gl/5sikBzx4nESgn2MQ6>

Data from the BOUSSOLE cruises and buoy are available at:

http://www.obs-vlfr.fr/Boussole/html/boussole_data/login_form.php

Cruise Report

Friday 09 September 2022

Bad weather prevented departure from the Nice harbour.

Saturday 10 September 2022

Bad weather prevented departure from the Nice harbour.

Sunday 11 September 2022 (UTC)

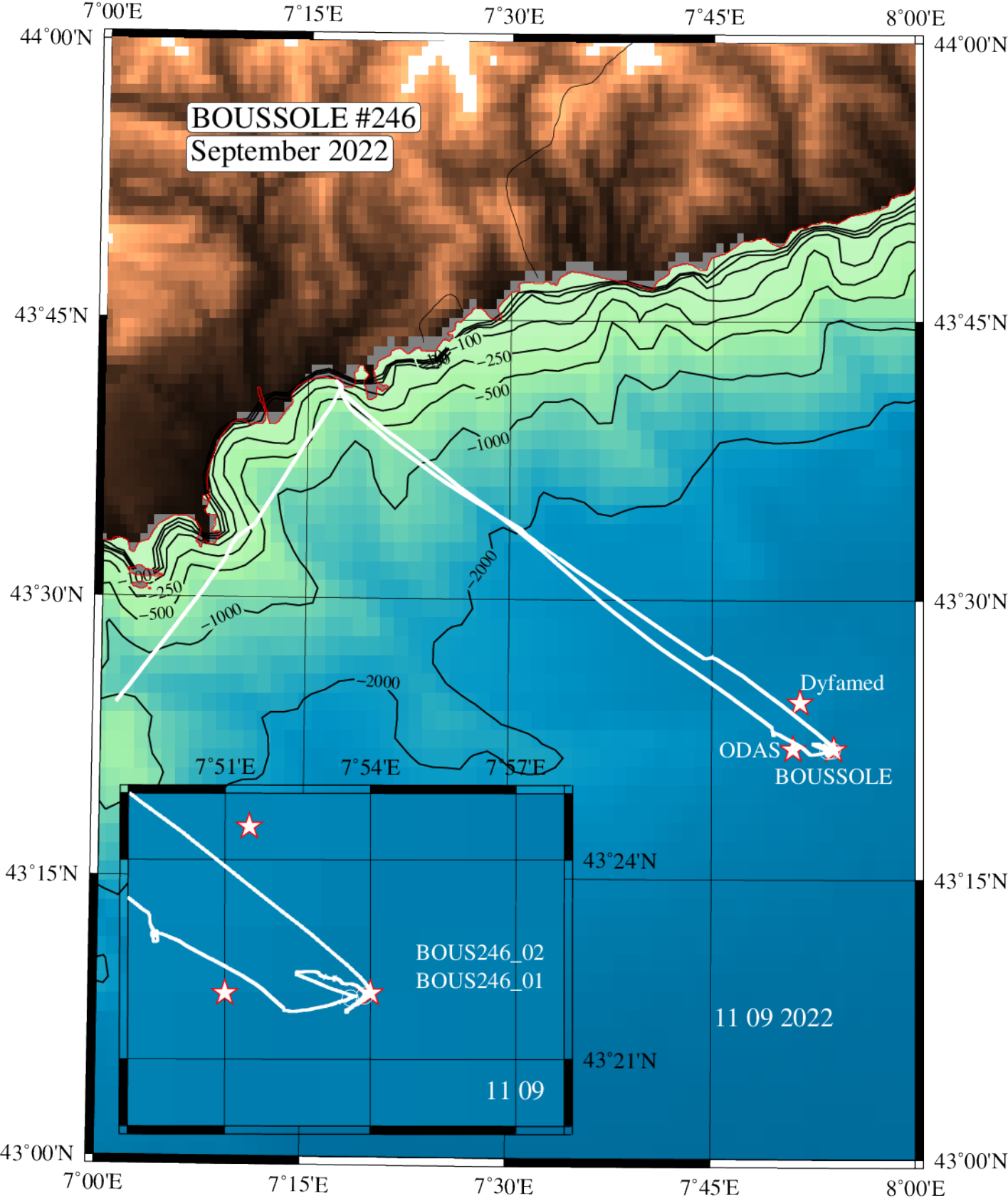
People on board: Ewen Ancel, Céline Dimier and Melek Golbol.

0640 Departure from the Nice harbour.
1000 Arrival at the BOUSSOLE site.
1010 CTD 01, 400 m with water sampling at 400, 200, 150, 80, 70, 60, 50, 40, 30, 20, 10 and 5 m for HPLC, and a_p .
1100 C-OPS 01, 02, 03.
1205 CTD 02, 400 m with water sampling at 5 m for TSM, TA/TC, DO and pH (with a 0.2 μ m filter on a-Sphere and with 2 minutes stop at 400, 150 m and 7 minutes stop at 80, 60, 50, 40 m) (with cap on the HS6).
1220 Secchi 01, 26 m.
1350 Manta horizontal net (MOOSE program).
1430 Departure to the Nice harbour.
1840 Arrival to the Nice harbour.

Problems identified during the cruise

- The BOUSSOLE C-OPS EdZ radiometer (S/N #152) was sent to the manufacturer for repair. The EdZ radiometer was replaced with the one shared among the marine optics and remote sensing group at LOV (S/N #182). So, the configuration of the C-OPS is different: there were some differences between EdZ and EuZ wavelengths.
- The CIMEL photometer did not work. Unfortunately, it is not possible to send it to the manufacturer for maintenance because of its obsolescence.
- The ship fluorometer is now out of service. It is not repairable because of its obsolescence. It will be replaced during the works planned on the R/V *Téthys* in 2023.

Appendices



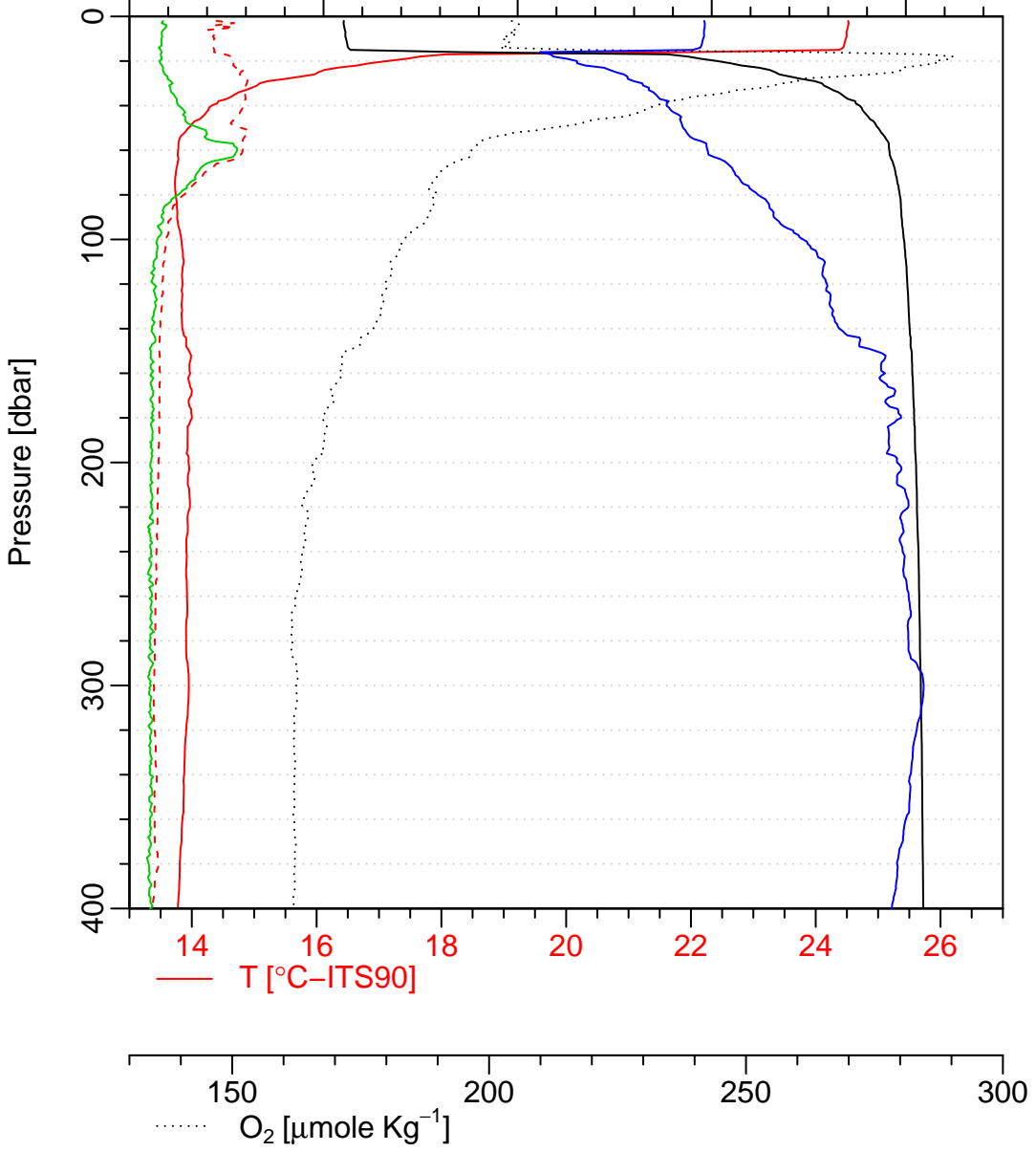
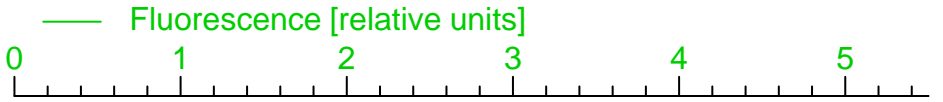
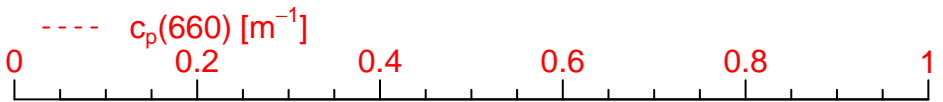
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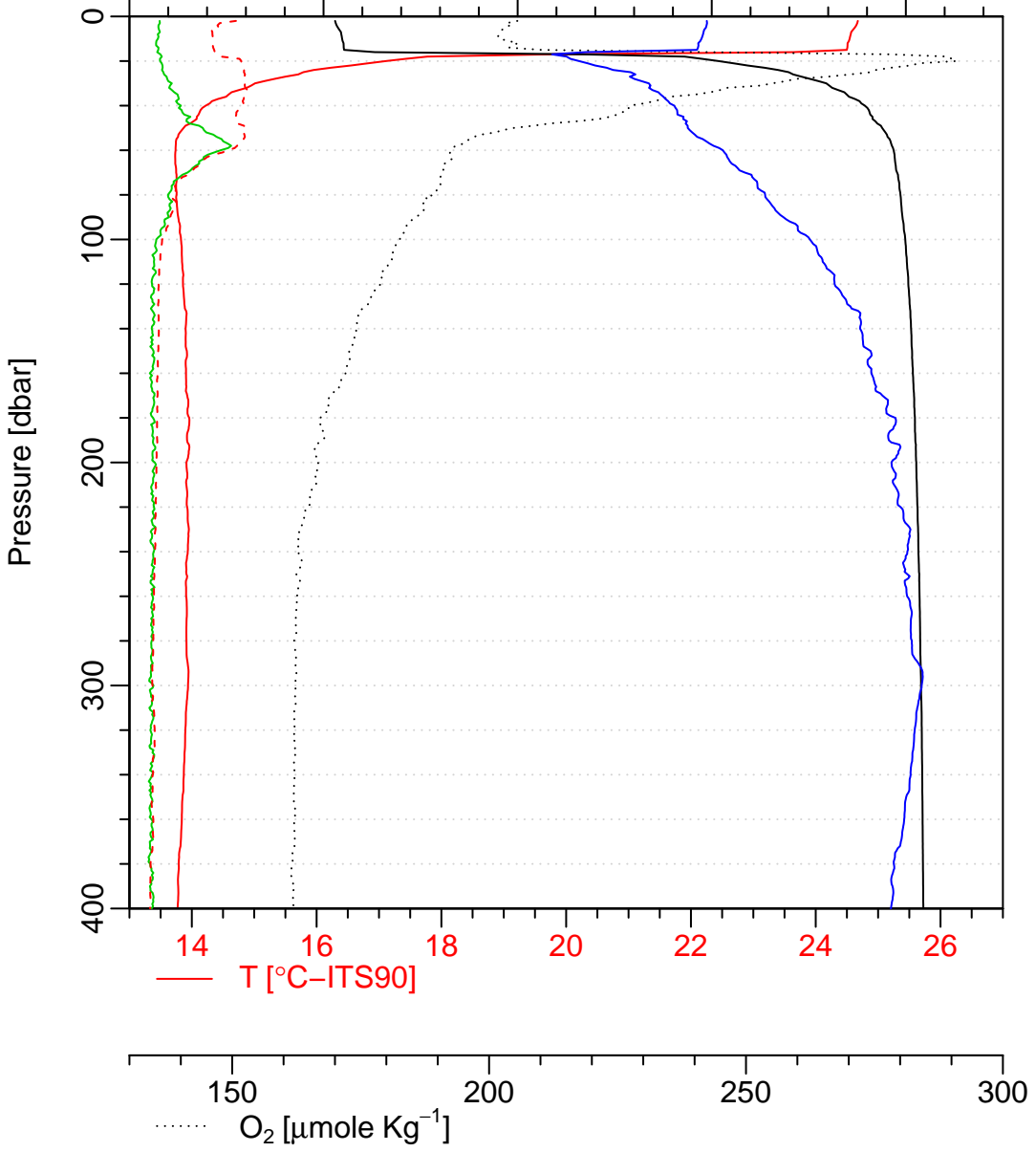
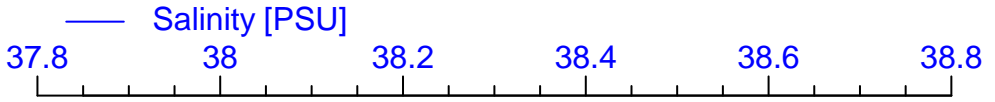
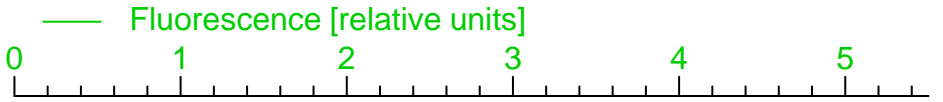
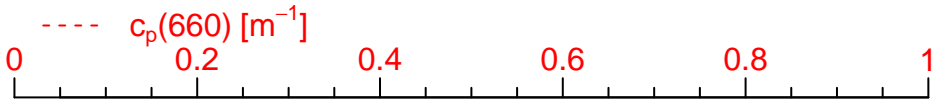
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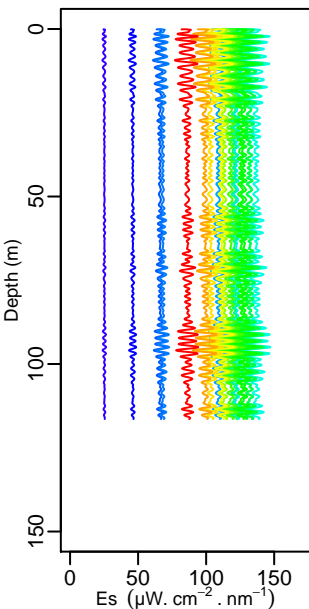
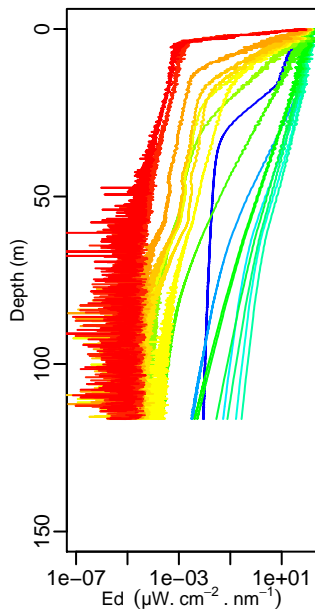
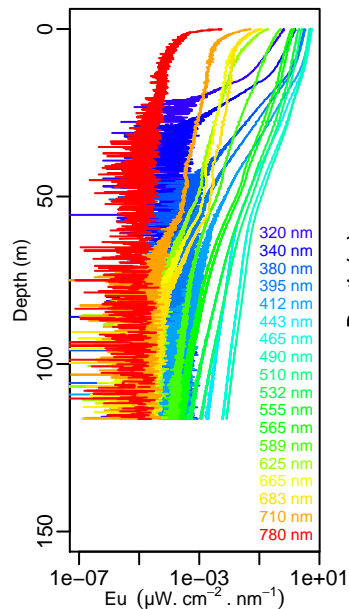
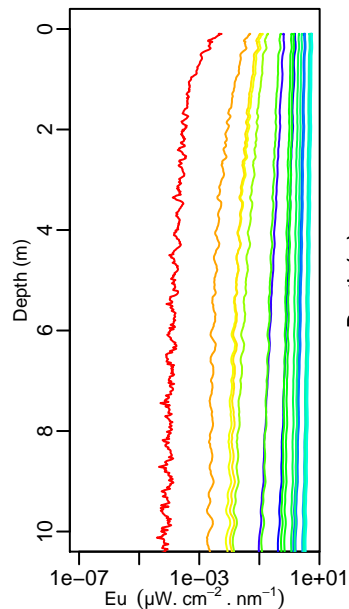
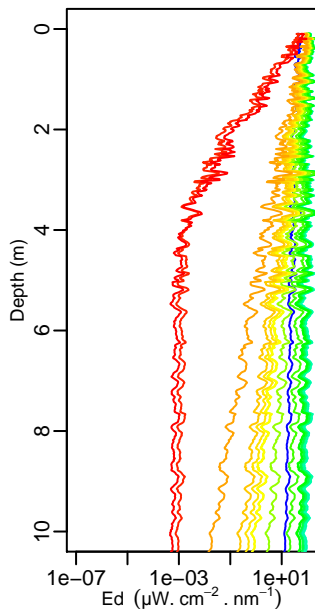
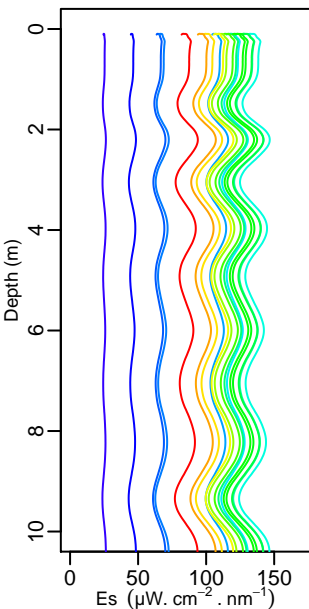
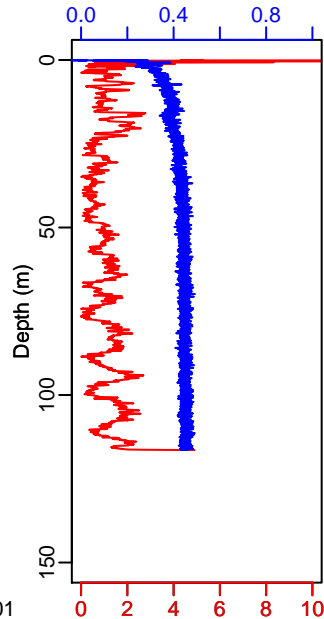
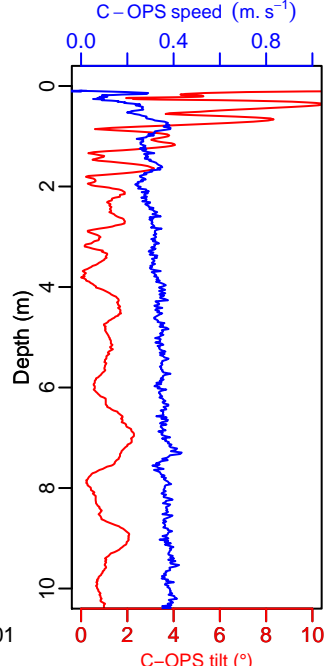
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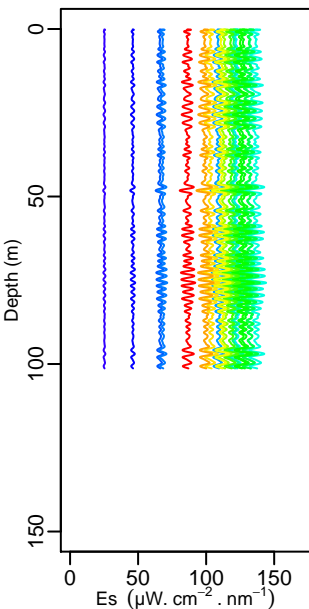
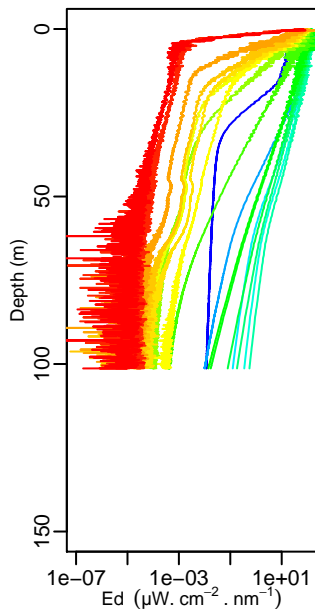
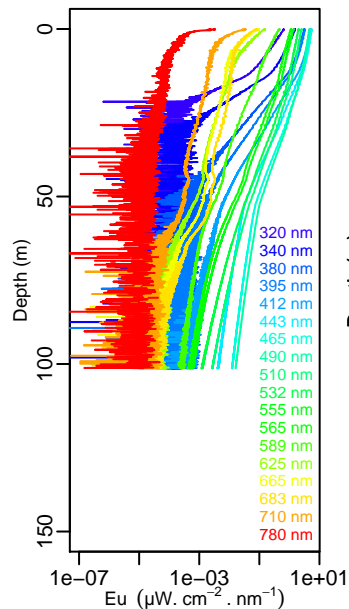
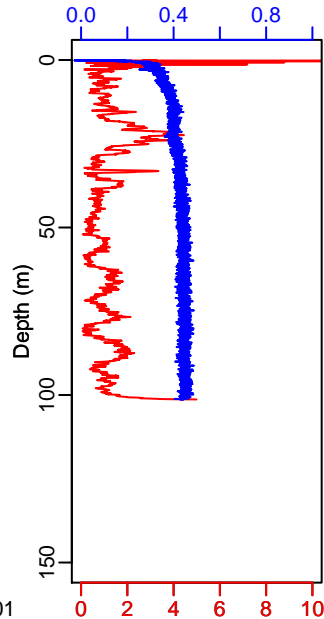
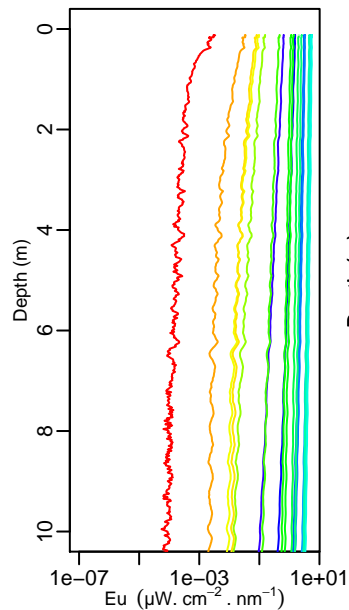
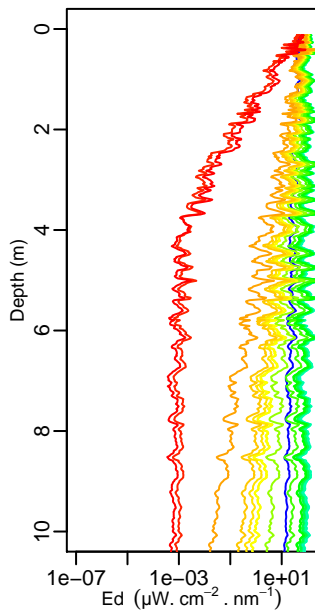
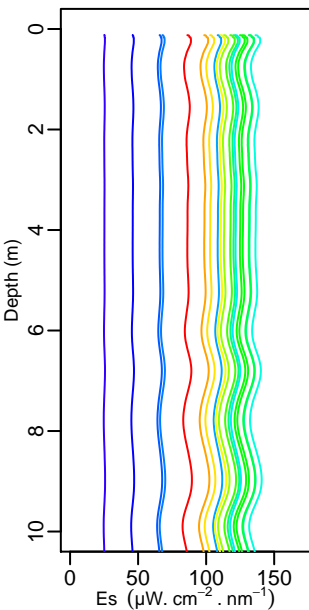
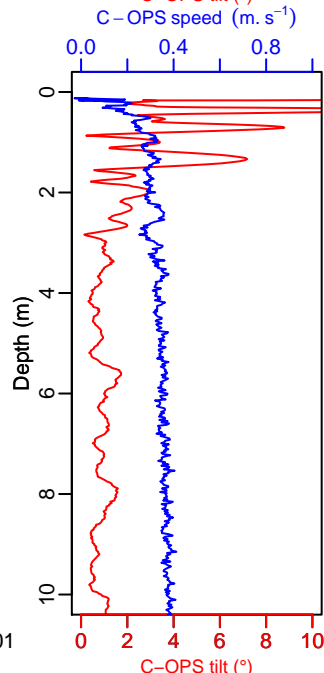
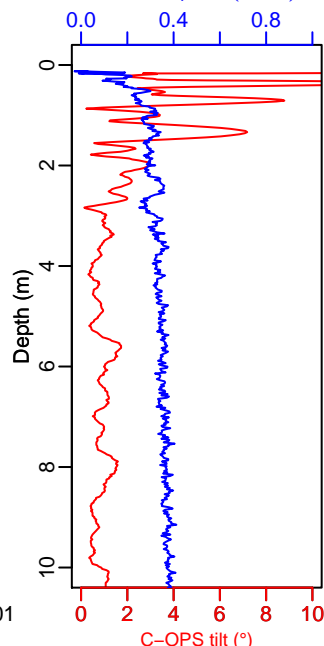


bous246_02

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