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OPB201 – On-board teaching
TD Analysis of PHYBIO data using Matlab

1) Study of the basic hydrographic parameters (temperature, salinity, and density) measured at a CTD station of your choice (if possible, each person takes a different station) of the PHYBIO 2019 campaign, the data of which is stored in the MIO/pytheas cloud accessible via Ametice: https://ametice.univ-amu.fr/mod/folder/view.php?id=1243881.

Create figure of the vertical profiles of T, S, and density (see info in the Matlab section below).

Depending on the pairs/topics you have chosen to cover during PHYBIO 2020, prepare one of the following topics:

2a) TS diagram – Plot a TS diagram for your chosen station
- Analyse the stratification and stability of the water column at that station, using Questions 1 et 2a. Indicate at which water depths the water column is stable or unstable.

Note: You can do this either with T and S, or conservative T and absolute S, or both.

2b) Examine the horizontal current measured by the ADCP (toolboxes m_map and m_quiver)

2c) Examine vertical section of the parameters measured with the MVP.

2d) Examine the continuous surface measurements obtained from the hull-mounted thermosalinometer and fluorometer of RV Téthys II.

%%%%%%% **Notes on Matlab** **%%%%%%%%%%%%%%%%%%%%**

1) Make sure you are in you working directory and place the data into a clear tree structure.

2) Use the Matlab help function if needed (>help name_of_script or online help) or consult the Matlab Readme **MATLAB_aide.pdf** in the **PHYBIO_matlab** directory and some Matlab tricks in **Matlab_trucs** for specific hints.

e.g., to load an ASCII file of the descending CTD into Matlab (this is an example!):

>> ctd1d=importdata('dPHYBIO_20180325_ST_B_CTD_02.asc',' ',1)
careful: in the above command it is …. asc','space',1).

This creates a structure in Matlab.
For example ctd1d.data(:,4) is the column containing temperature
ctd1d.data(:,12) is the column containing the depth (positive values)
which you can visualise using the "plot" command to obtain a figure with temperature on the x-axis and depth along the y-axis (make sure to have depth increase downward).

>>subplot(131)

>>plot(ctd1d.data(:,4),-ctd1d.data(:,12))

3) To create **TS diagrams**, you need to obtain the following Matlab scripts:
tsdiagrm.m, swfreezt.m, and swstate.m.

They can be downloaded from my site:
https://people.mio.osupytheas.fr/~petrenko/TEACHING/MATLAB/
and belong to the freely accessible toolbox:
http://woodshole.er.usgs.gov/operations/sea-mat/#Hydrographic%20Tools

where gsw_SA_CT_plot.m is for scripts associated with Tcons., Sabs. (gsw_###.m), when obtaining the TEOS10 toolbox as described in Chapter 4 of this course (http://www.teos-10.org/software.htm#1; McDougall and Barker, 2011).

4) Reminder: for the maps you need to download: http://www.eos.ubc.ca/~rich/map.html

5) To analyse the MVP data, follow the instructions in the Readme file; you need m_map and the LATEXtools http://www.mio.univ-amu.fr/?LATEX-tools