VPR Data Summary: Onboard

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A quick reference guide for checking and visualizing VPR data during a cruise. Written at Bedford Institute of Oceanography for the August 2019 Southern Gulf of St. Lawrence cruise. Intended for internal use. Once raw data has been run through autoDeck, this script can be used to visualize ROIs and CTD data.

## Software Requirements:

R: <https://www.r-project.org/>

RStudio: <https://www.rstudio.com/products/rstudio/download/>

## R Packages:

To install packages (only required on first use)

> install.packages(‘packageName’)

To call packages into library for use (after installation)

> library(‘packageName’)

**- ggplot2 - akima - interp**

**- dplyr - oce - gridExtra**

**- metR**

## File Requirements:

These files contain functions required to run plotting and processing

* EC\_functions.R
* get\_vpr\_summary\_functions.R
* VP\_easyPlot.R

Files can be downloaded here: [R:\Shared\ChisholmE\VPR\_plotting](file:///R:\Shared\ChisholmE\VPR_plotting)

VPR Data files required for processing

* ctd.dat files output by autoDeck
* ROI images (organized into directory structure output by AutoDeck)

## Directory structure

Table 1. Structure for VPR data (bold text must be matched exactly, italic text can be modified)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *C:* | **data** | *cruise* | **rois** | **vpr***#* | **d***###* | **h***##* | **roi**.*##########*.**tif** |
|  |  |  |  |  |  | **h***##***ctd.dat** |  |

Note: This structure should be the default output by autoDeck software.

## Step by Step

1. Open R project ‘VPR\_plotting.RProj’
2. Open script ‘VP\_easyPlot.R’
3. Update ‘Step 1’ in easyPlot to reflect
   * 1. cruise name,
     2. vpr cast of interest, station and event number
     3. file paths (plotdir – where plots will save and basepath- where your data is)
     4. QC ranges for temperature, pressure, and salinity
4. Source ‘VP\_easyPlot.R’ by clicking ‘source’ button in top right corner or entering this line into console: source(‘VP\_easyPlot.R’)

*Note:* A prompt will ask you if you would like to QC data before plotting, This will remove any data points outside the ranges you specified in step 1. The data summary report will still reflect total original data and will identify points which have been removed based on QC ranges

## Output

The script will output a series of plots and a report into the directory you specified in step 1 (plotdir)

Each plot will be named ‘vpr#..............png’ based on the cast that was processed. If you would like to separate plots by cast you will have to update the plotdir variable each time you run a new cast.

vpr#dataSummary.txt

* summary of data ranges for CTD data, including data points outside expected ranges

vpr#...\_contour.png

* contour plot of interpolated values with vpr path and binned ROI concentration (produced for salinity, temperature, sigmaT)

vpr#conPlots\_conc.png

* contour plot of interpolated ROI concentration with VPR path overlaid

vpr#vprPath.png

* VPR path (pressure change over time)

vpr#summaryCTDplots.png

* 3 panel plot with temperature/ salinity and fluorescence/density profiles as well as ROI per litre concentration profile with average value trend line

## Trouble Shooting

Error: “Can’t find function ….”

* Ensure all packages are installed and have been called into library
* Ensure that working directory is set properly (should be folder containing function scripts , EC\_functions and get\_vpr\_summary\_functions)

Error: “in file (con, “r”) : cannot open the connection”

* Result of inaccurate file name or path
* Check plotting directory and basepath set in step 1
  + plotdir should be folder where you wish to save plots, file path ending in ‘/’
  + basepath should be location of data directory (table 1) eg. ‘C:/data/’
* Check ‘ctd\_files’ that there are valid ctd.dat files present for specified tow number

Error: “Fatal Error”, “lost connection with R session”

* This error will quit out of R and require you to reopen the project
* Can be caused by interpolation function
* find lines “akima::interp(….)”
  + Can add argument, duplicate = ‘strip’, which will remove duplicate values and speed interpolation
  + Can switch packages (identical function with slightly different source code, is sometimes more robust), replace akima::interp(…) with interp::interp(….)

Warning: Removed … rows containing non-finite values (stat\_contour).

* This is a normal warning when plotting interpolated grid, can be safely ignored

Warning: package ‘….’ was built under R version 3.5.3

* Normal warning to alert you to the version of R being run, safely ignored