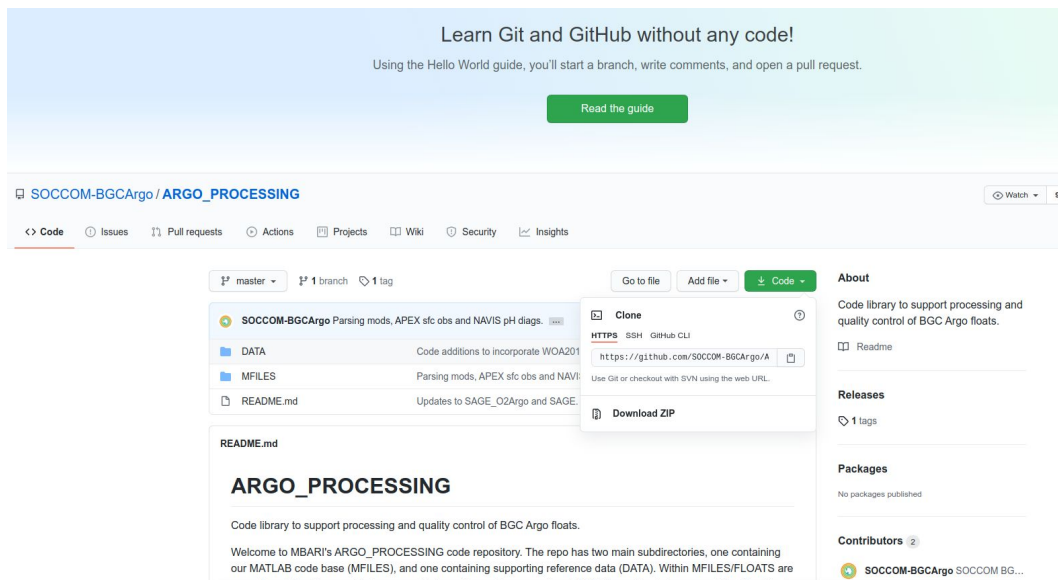


SAGE O₂-Argo: SOCCOM Assessment and Graphical Evaluation for Oxygen

How to do DM QC with SAGE O₂?

Contact: raphaelle.sauzede@imev-mer.fr

Where to find SAGE O₂ GUI?



Clone the GUI repository “ARGO_PROCESSING” from github here:
https://github.com/SOCCOM-BGCArgo/ARGO_PROCESSING and place it somewhere on your local machine (for example /home/username/Documents/MATLAB/, where username is the username of the machine)

SAGE O₂: Why?

→ visualize float oxygen data from Argo NetCDF files in comparison to **WOA climatology** and **NCEP reanalysis** products (used to estimate atmospheric oxygen partial pressure along a float track) in order to derive float specific gain correction values

Where to find the user manual of SAGE O₂:

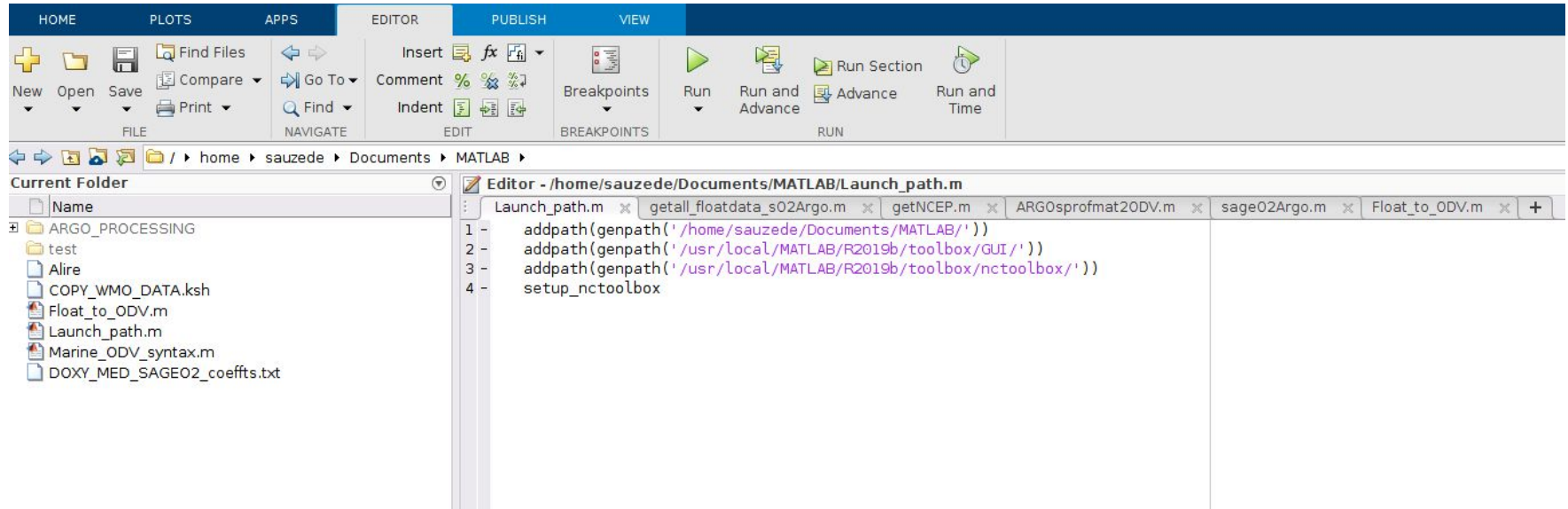
<https://usermanual.wiki/Document/SageO2ArgoManual.1001023672/view>

1- Toolbox required for installing SAGE O₂

- MATLAB must be properly installed and licensed on your machine before proceeding
- 2 freely-available external MATLAB toolboxes that must be downloaded prior to GUI use :

Toolbox	Download	Notes
GUI Layout Toolbox	https://www.mathworks.com/matlabcentral/fileexchange/47982-gui-layout-toolbox	Note the two separate download options for MATLAB versions before and after R2014b.
Nctoolbox-1.1.3	https://github.com/nctoolbox/nctoolbox	Be sure to permanently add the toolbox setup to your startup.m file. See notes under “setup” at the download link location.

2- Create a file: launch_path.m



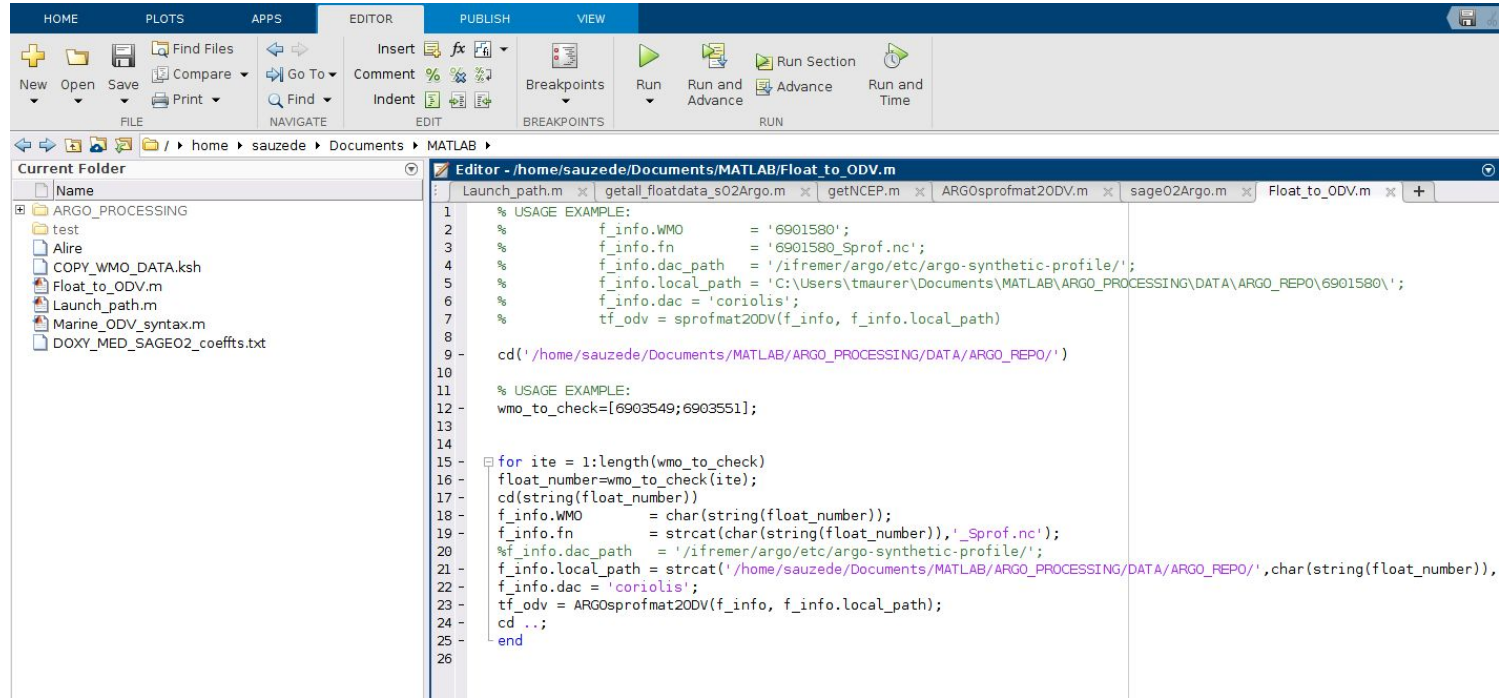
→ and run it

3- Add Argo data to Argo repository

```
(base) sauzede@sauzede-Latitude-5490:~$ cd Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO/
(base) sauzede@sauzede-Latitude-5490:~/Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO$ ls
6902120      6901466  6901774  6902740      6902900  6903247
6902121      6901467  6901775  6902740_JP  6902901  6903024  6903249
6902122      6901470  6901897  6902803      6902903  6903025  6903262
6902123      6901471  6901898  6902804      6902904  6903026  6903266
6902124      6901476  6902687  6902828      6902905  6903153  6903549
6902125      6901487  6902701  6902870      6902906  6903180  6903550
6901805      6901573  6902733  6902871      6902907  6903204  6903551
6901460      6901577  6902734  6902872      6902908  6903222  ARGO_REPO_help.txt
6901462      6901596  6902735  6902873      6902909  6903225  test
6901463      6901657  6902736  6902874      6902935  6903237
6901464      6901770  6902737  6902875      6902936  6903238
6901464_ori  6901771  6902738  6902876      6902937  6903240
6901465      6901772  6902739  6902880      6902954  6903246
(base) sauzede@sauzede-Latitude-5490:~/Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO$ mkdir 6902954
(base) sauzede@sauzede-Latitude-5490:~/Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO$ cp /home/sauzede/ARGO_DATA/corl
olis/6902954/*.nc 6902954/
(base) sauzede@sauzede-Latitude-5490:~/Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO$ ls 6902954
6902954 BRtraj.nc 6902954_prof.nc 6902954_Sprof.nc ODV6902954.TXT
6902954 meta.nc 6902954_Rtraj.nc 6902954_tech.nc
(base) sauzede@sauzede-Latitude-5490:~/Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO$
```

→ Need the Argo formatted *.BRtraj.nc, *meta.nc, and *Sprof.nc

4- Create ODV file: Float_to_ODV.m



The screenshot displays the MATLAB environment with the 'Float_to_ODV.m' script open in the Editor. The script is designed to process float data into ODV format. It includes a usage example and a loop to process multiple float numbers. The 'Current Folder' pane on the left shows the directory structure, including 'ARGO_PROCESSING' and 'test' folders, and files like 'Float_to_ODV.m', 'Launch_path.m', and 'Marine_ODV_syntax.m'.

```
1 % USAGE EXAMPLE:
2 % f_info.WMO = '6901580';
3 % f_info.fn = '6901580_Sprof.nc';
4 % f_info.dac_path = '/ifremer/argo/etc/argo-synthetic-profile/';
5 % f_info.local_path = 'C:\Users\tmaurer\Documents\MATLAB\ARGO_PROCESSING\DATA\ARGO_REPO\6901580\';
6 % f_info.dac = 'coriolis';
7 % tf_odv = sprofm20DV(f_info, f_info.local_path)
8
9 cd('/home/sauzede/Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO/')
10
11 % USAGE EXAMPLE:
12 wmo_to_check=[6903549;6903551];
13
14
15 for ite = 1:length(wmo_to_check)
16     float_number=wmo_to_check(ite);
17     cd(string(float_number))
18     f_info.WMO = char(string(float_number));
19     f_info.fn = strcat(char(string(float_number)), '_Sprof.nc');
20     %f_info.dac_path = '/ifremer/argo/etc/argo-synthetic-profile/';
21     f_info.local_path = strcat('/home/sauzede/Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO/', char(string(float_number)),
22     f_info.dac = 'coriolis';
23     tf_odv = ARGOSprofmat20DV(f_info, f_info.local_path);
24     cd ..;
25 end
26
```

➔ and run it to create ODV file for each float you want to process with SAGE O₂

NB: if you are on Linux

In ARGOSprofmat2ODM.m (in
/ARGO_PROCESSING/MFILES/GUIS/SAGE_O2Argo/SProf_Conversion/):

Line 58: change HOMEDIR with PATH

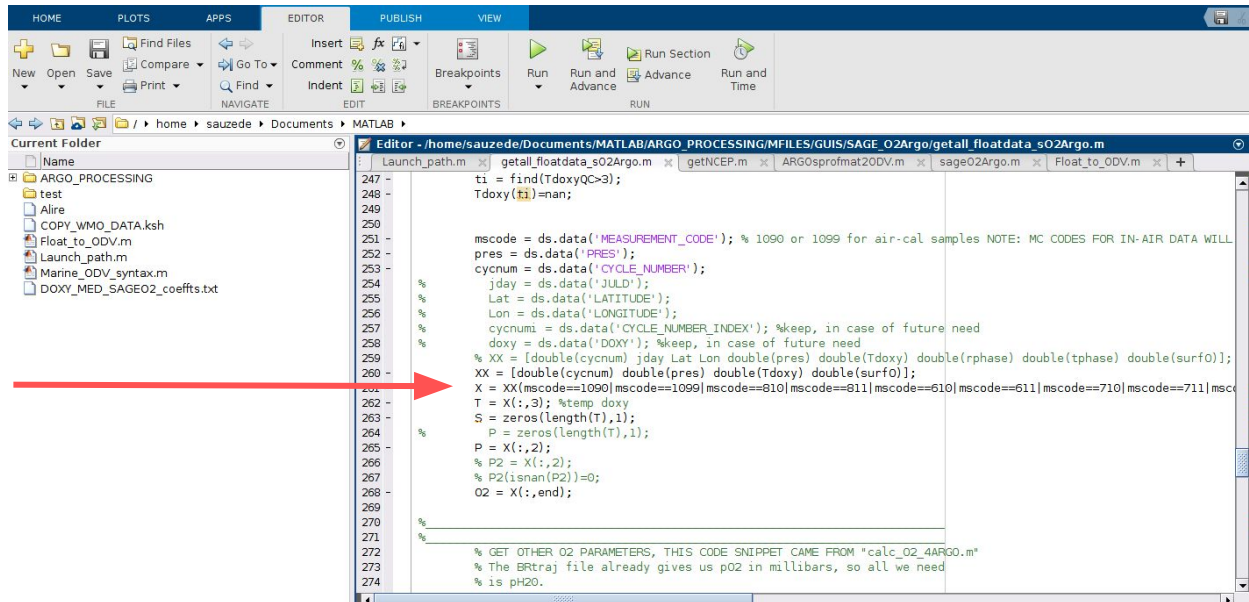
4- Create ODV file: Float_to_ODV.m

```
(base) sauzede@sauzede-Latitude-5490:~$ cd Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO/
(base) sauzede@sauzede-Latitude-5490:~/Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO$ ls
6902120      6901466  6901774  6902740  6902900  6902903  6903247
6902121      6901467  6901775  6902740_JP  6902901  6903024  6903249
6902122      6901470  6901897  6902803  6902903  6903025  6903262
6902123      6901471  6901898  6902804  6902904  6903026  6903266
6902124      6901476  6902687  6902828  6902905  6903153  6903549
6902125      6901487  6902701  6902870  6902906  6903180  6903550
6901805      6901573  6902733  6902871  6902907  6903204  6903551
6901460      6901577  6902734  6902872  6902908  6903222  ARGO_REPO_help.txt
6901462      6901596  6902735  6902873  6902909  6903225  test
6901463      6901657  6902736  6902874  6902935  6903237
6901464      6901770  6902737  6902875  6902936  6903238
6901464_ori  6901771  6902738  6902876  6902937  6903240
6901465      6901772  6902739  6902880  6902954  6903246
(base) sauzede@sauzede-Latitude-5490:~/Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO$ mkdir 6902954
(base) sauzede@sauzede-Latitude-5490:~/Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO$ cp /home/sauzede/ARGO_DATA/coriolis/6902954/*.nc 6902954/
(base) sauzede@sauzede-Latitude-5490:~/Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO$ ls 6902954
6902954_BRtraj.nc  6902954_prof.nc  6902954_Sprof.nc  ODV6902954.TX1
6902954_meta.nc   6902954_Rtraj.nc  6902954_tech.nc
(base) sauzede@sauzede-Latitude-5490:~/Documents/MATLAB/ARGO_PROCESSING/DATA/ARGO_REPO$
```

5- Modifications for measurement codes to find in air data

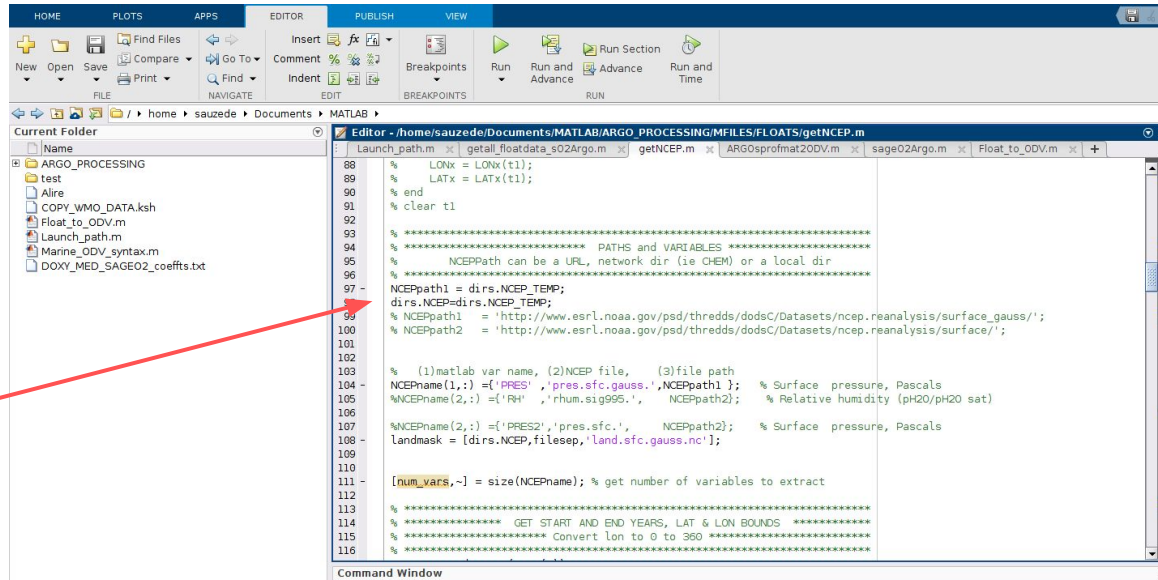
In `getall_floatdata_sO2Argo.m` (in `/ARGO_PROCESSING/MFILES/GUIS/SAGE_O2Argo/`):

Line 261: add mscodes 110/ 111/ 610/ 611/ 710/ 711/ 810/ 811



```
247 - ti = find(TdoxyQC>3);
248 - Tdoxy(ti)=nan;
249
250
251 - mscode = ds.data('MEASUREMENT_CODE'); % 1090 or 1099 for air-cal samples NOTE: MC CODES FOR IN-AIR DATA WILL
252 - pres = ds.data('PRES');
253 - cyncnum = ds.data('CYCLE_NUMBER');
254 - jday = ds.data('JULD');
255 - Lat = ds.data('LATITUDE');
256 - Lon = ds.data('LONGITUDE');
257 - cyncnumi = ds.data('CYCLE_NUMBER_INDEX'); %keep, in case of future need
258 - doxy = ds.data('DOXY'); %keep, in case of future need
259 - % XX = [double(cyncnum) jday Lat Lon double(pres) double(Tdoxy) double(rphase) double(tphase) double(surf0)];
260 - XX = [double(cyncnum) double(pres) double(Tdoxy) double(surf0)];
261 - X = XX(mscode==1090|mscode==1099|mscode==610|mscode==611|mscode==610|mscode==611|mscode==710|mscode==711|msc
262 - T = X(:,3); %temp doxy
263 - S = zeros(length(T),1);
264 - P = zeros(length(T),1);
265 - %
266 - P = X(:,2);
267 - % P2 = X(:,2);
268 - % P2(isnan(P2))=0;
269 - O2 = X(:,end);
270
271
272
273 - % GET OTHER O2 PARAMETERS, THIS CODE SNIPPET CAME FROM "calc_O2_4ARGO.m"
274 - % The BRtraj file already gives us po2 in millibars, so all we need
275 - % is pH2O.
```

5- NCEP data (in air climatology)



```
88 % LONx = LONx(t1);
89 % LATx = LATx(t1);
90 % end
91 % clear t1
92
93 % ***** PATHS and VARIABLES *****
94 % ***** NCEPpath can be a URL, network dir (ie CHEM) or a local dir *****
95 % *****
96
97 NCEPpath1 = dirs.NCEP_TEMP;
98 dirs.NCEP=dirs.NCEP_TEMP;
99 % NCEPpath1 = 'http://www.esrl.noaa.gov/psd/thredds/dodsC/Datasets/ncep.reanalysis/surface_gauss/';
100 % NCEPpath2 = 'http://www.esrl.noaa.gov/psd/thredds/dodsC/Datasets/ncep.reanalysis/surface/';
101
102
103 % (1)matlab var name, (2)NCEP file, (3)file path
104 NCEPname(1,:) = ['PRES', 'pres.sfc.gauss.', NCEPpath1]; % Surface pressure, Pascals
105 % NCEPname(2,:) = ['RH', 'rhum.sig995.', NCEPpath2]; % Relative humidity (pH20/pH20 sat)
106
107 % NCEPname(2,:) = ['PRES2', 'pres.sfc.', NCEPpath2]; % Surface pressure, Pascals
108 landmask = [dirs.NCEP, filesep, 'land.sfc.gauss.nc'];
109
110
111 [num_vars, ~] = size(NCEPname); % get number of variables to extract
112
113 % *****
114 % ***** GET START AND END YEARS, LAT & LON BOUNDS *****
115 % ***** Convert lon to 0 to 360 *****
116 % *****
```

For info: getNCEP.m in /ARGO_PROCESSING/MFILES/FLOATS/ lines 97-100: I decommented NCEPpath1 = dirs.NCEP_TEMP; and I added dirs.NCEP = dirs.NCEP_temp

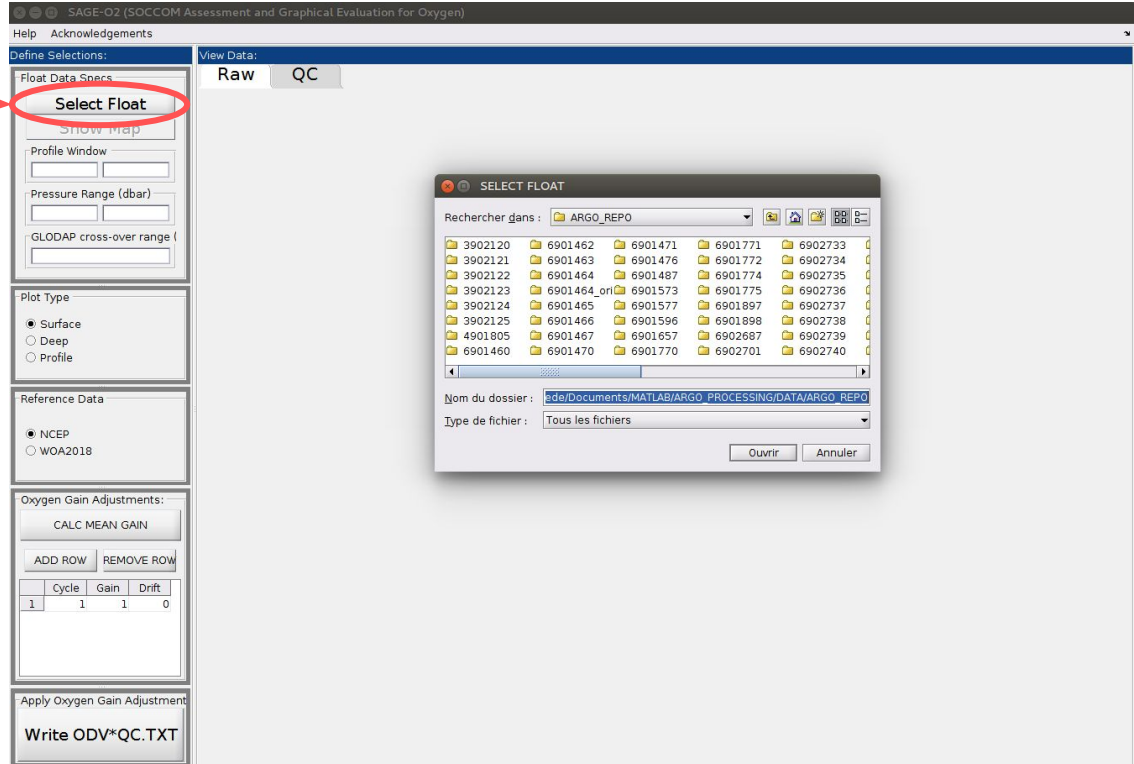
To download NCEP data: ftp://ftp.cdc.noaa.gov/Datasets/ncep.reanalysis/surface_gauss/
→ download pres.sfc.gauss.2020.nc for year 2020 in NCEP_TEMPORARY folder

5- Launch SAGE O₂ in MATLAB

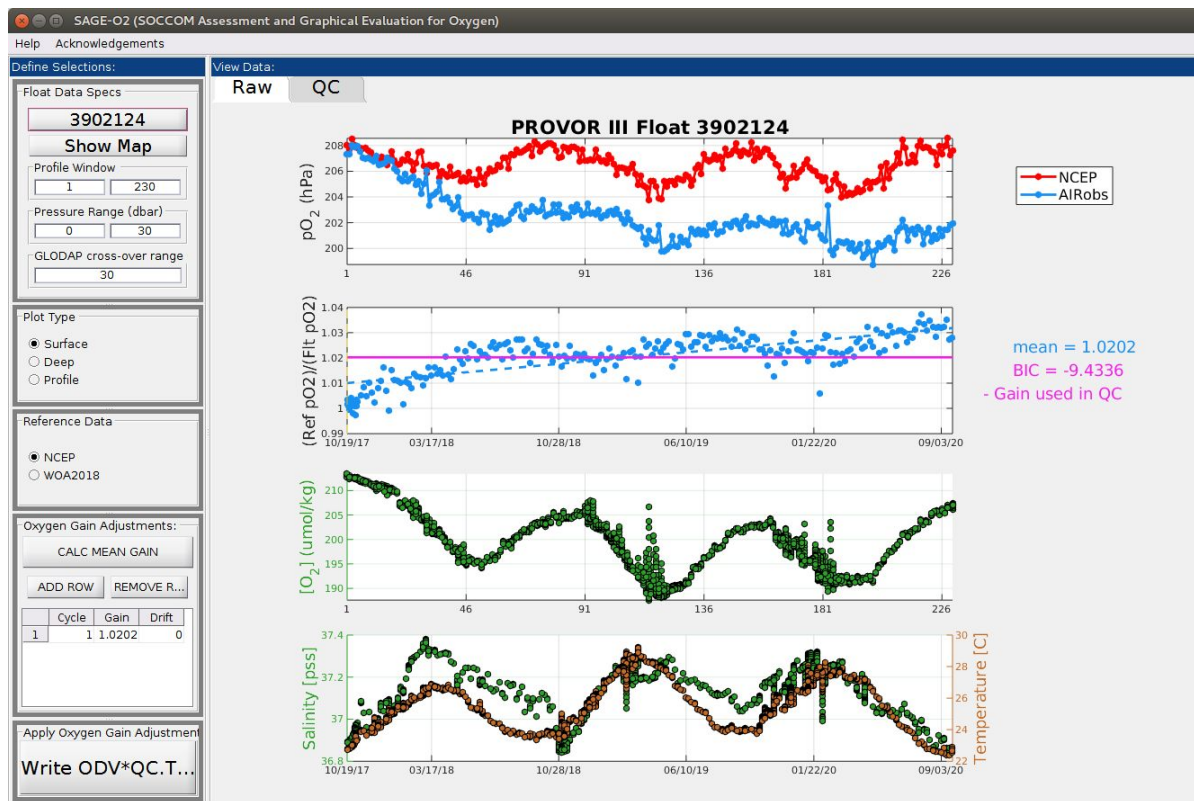
Command Window

New to MATLAB? See resources for [Getting Started](#).

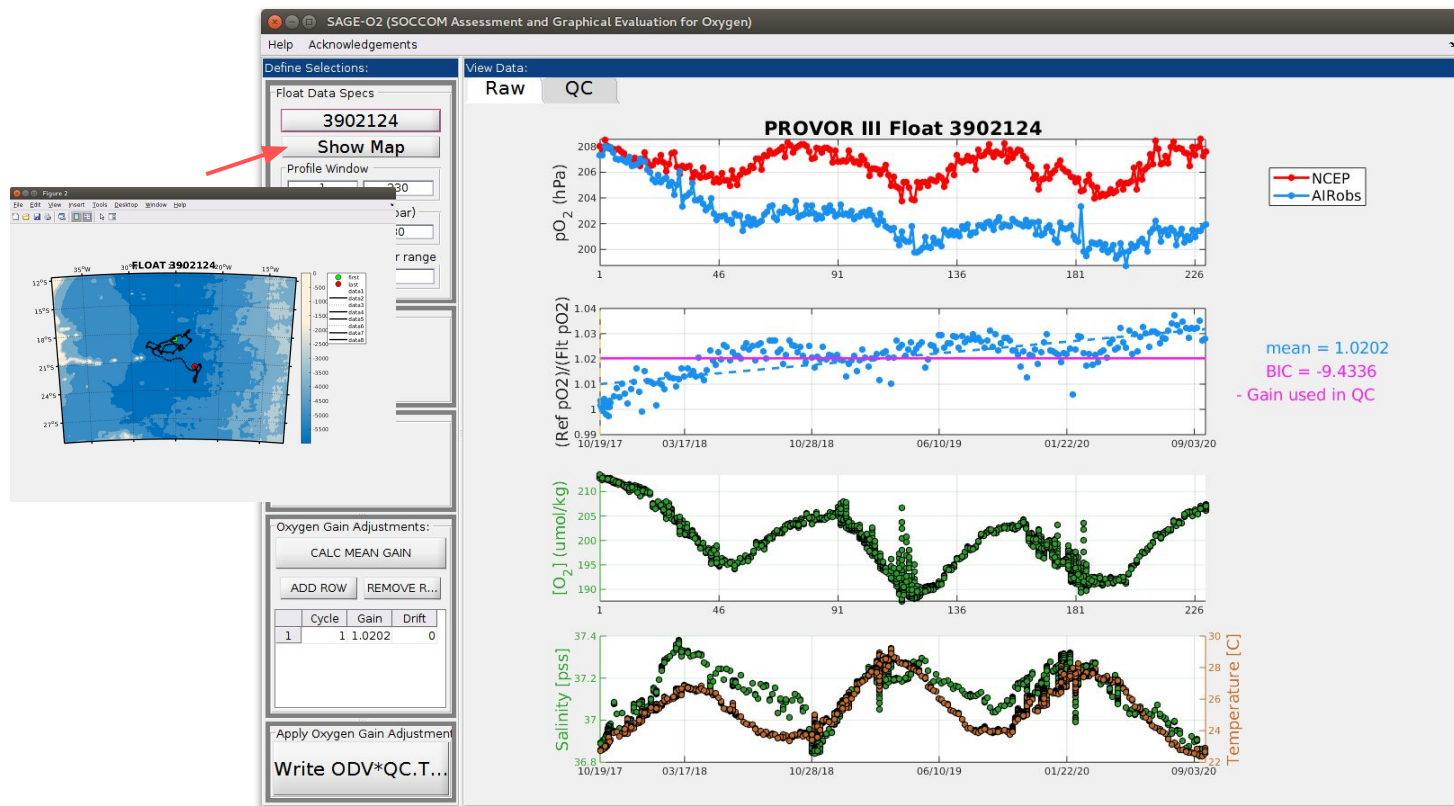
```
>> Launch_path  
NCTOOLBOX added to Matlab path  
>> sageO2Argo  
fx >>
```



6- SAGE O₂ GUI



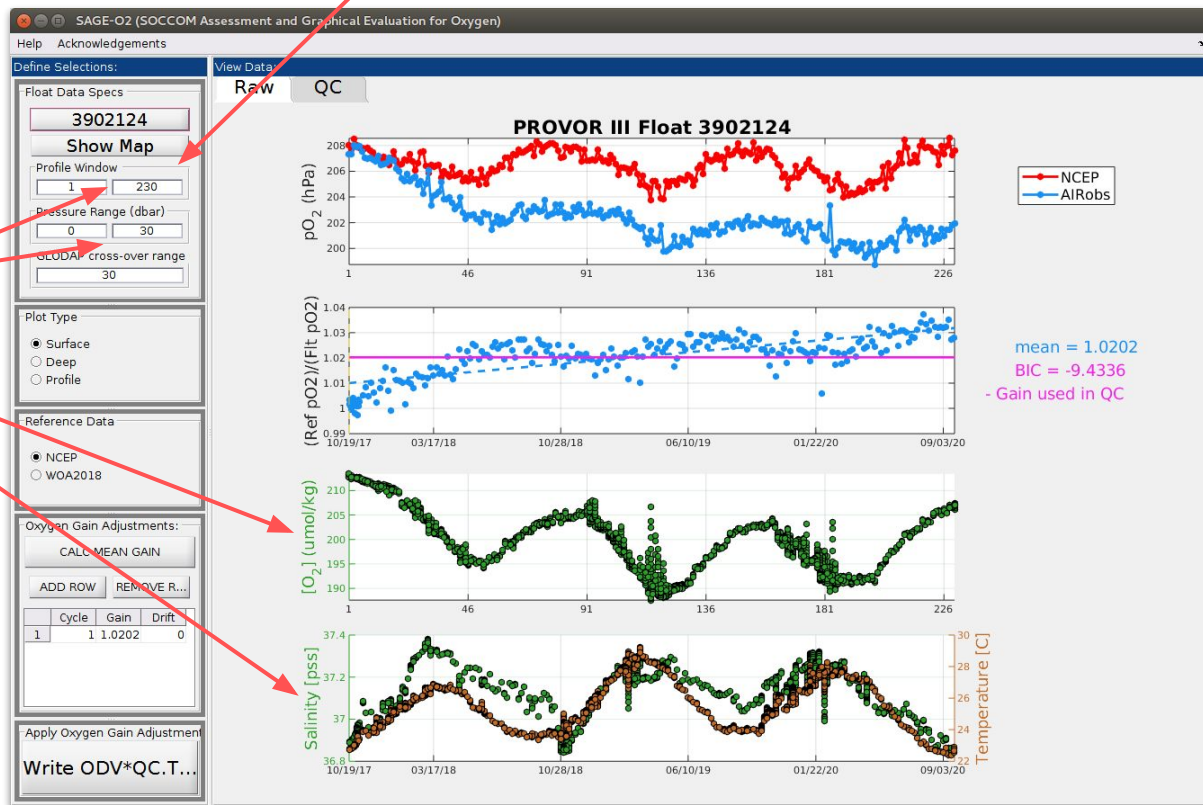
6- SAGE O₂ GUI



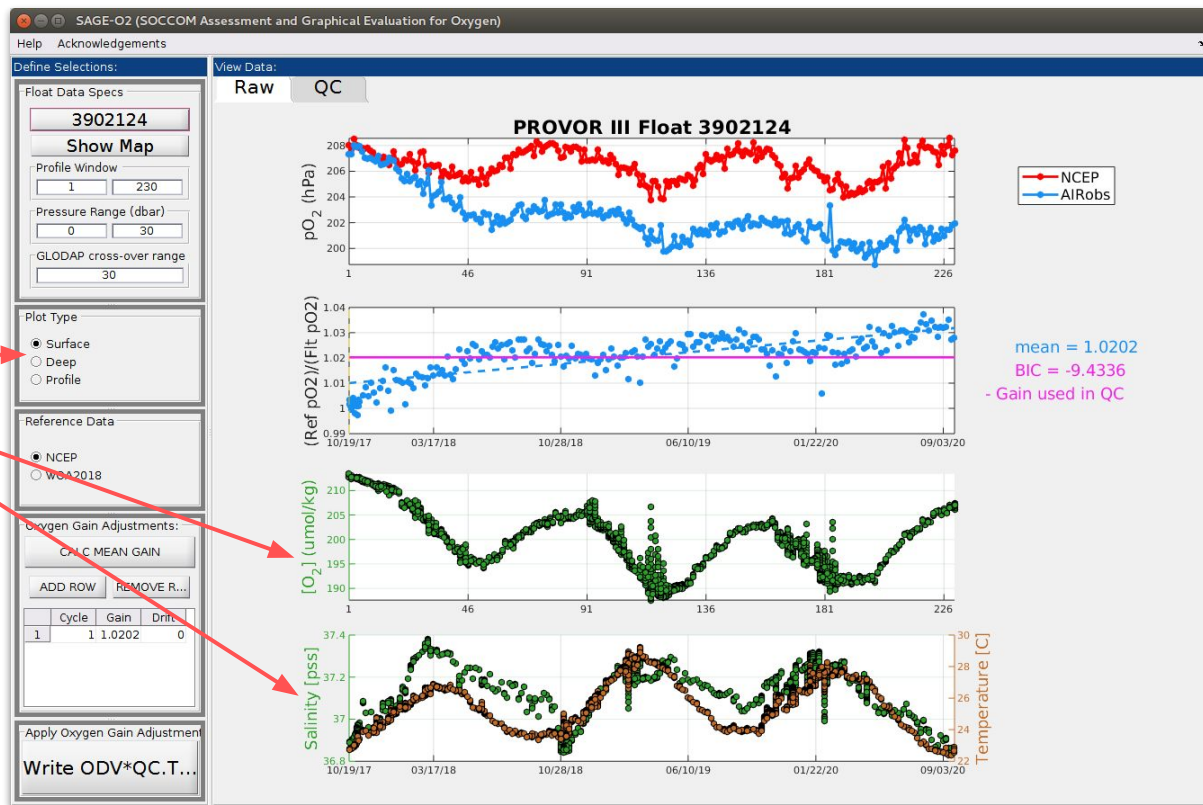
6- SAGE O₂ GUI

Number of cycle

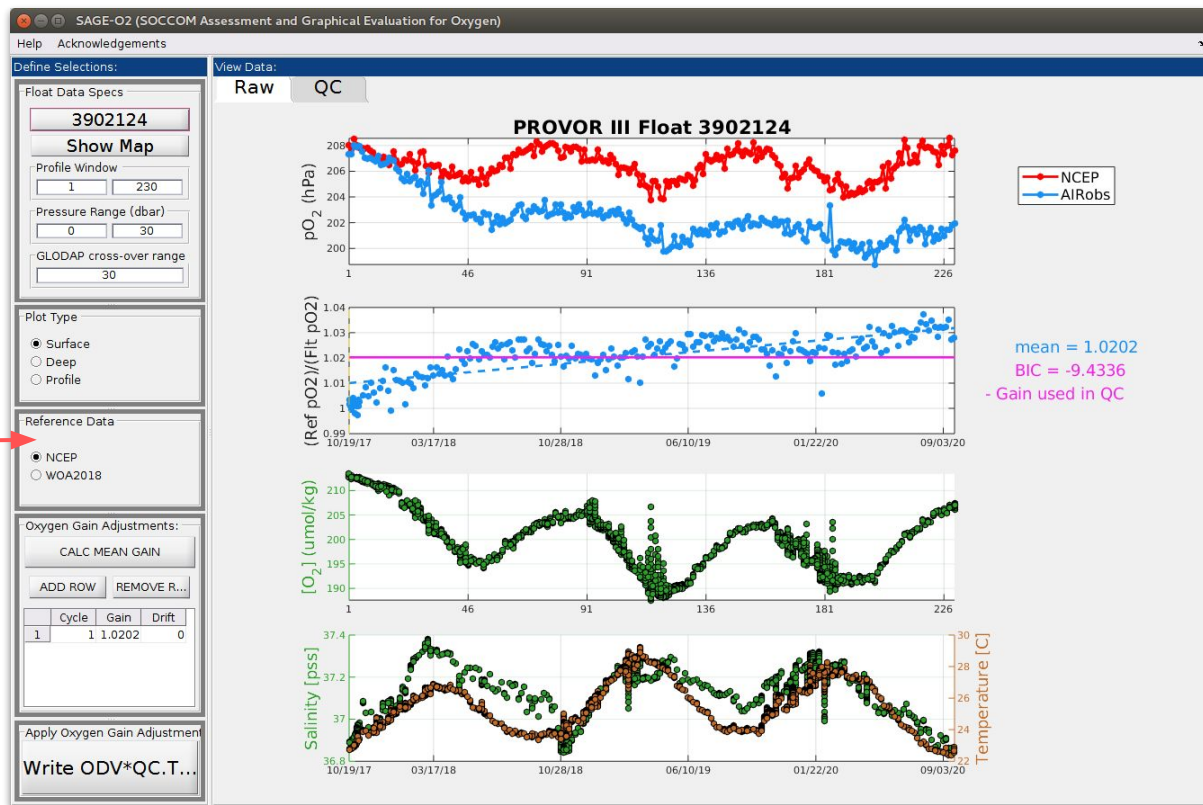
Change the pressure and cycle range



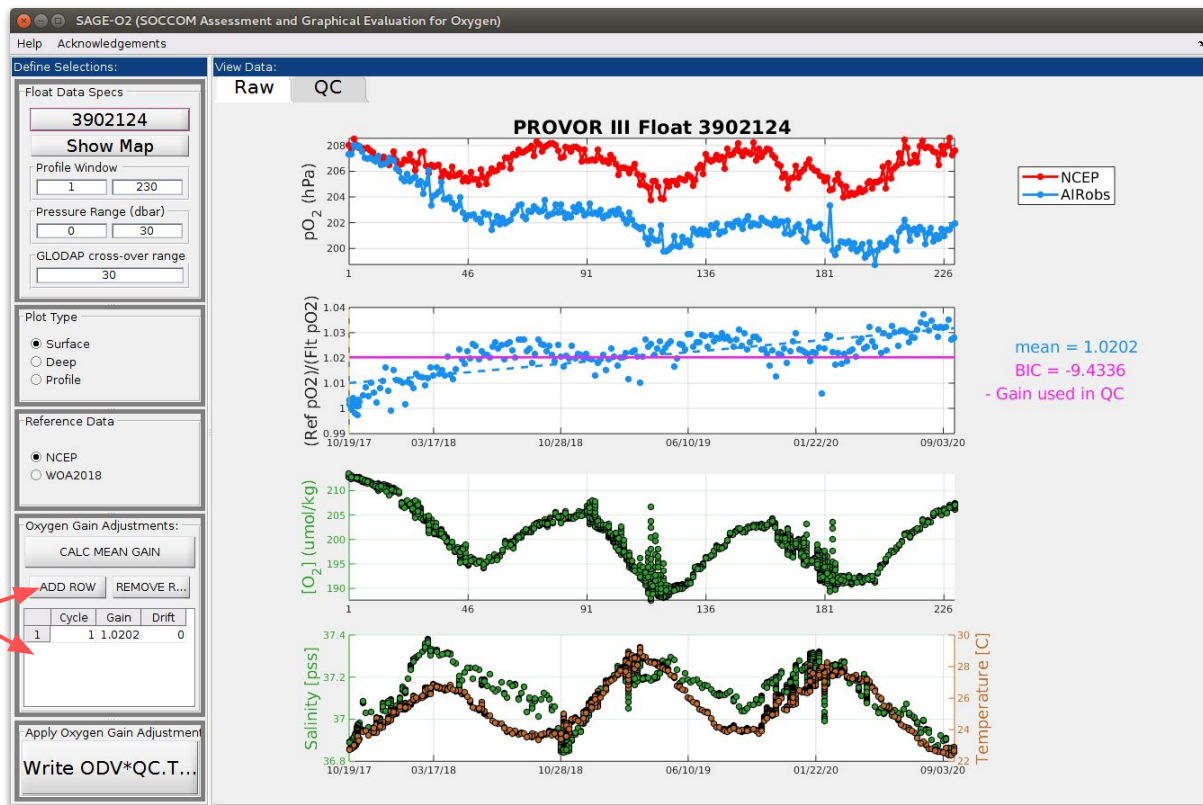
6- SAGE O₂ GUI



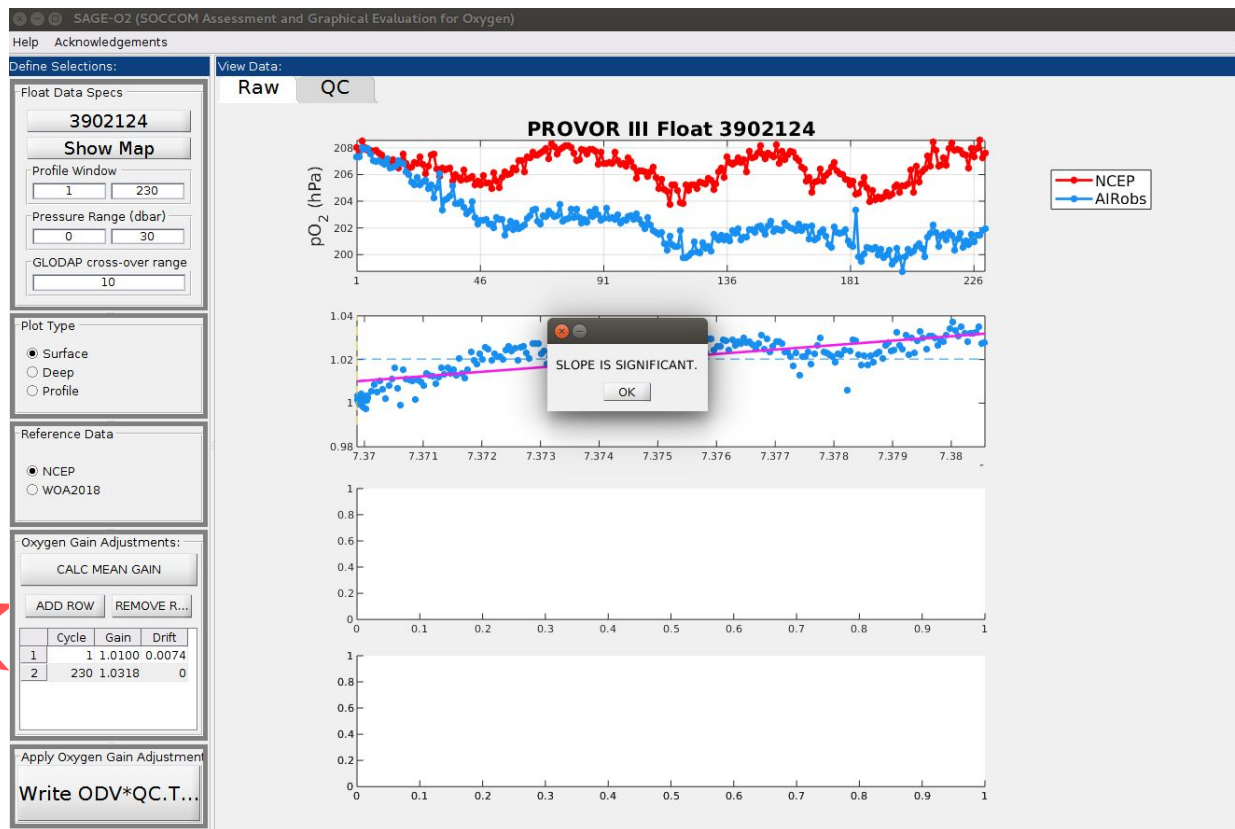
6- SAGE O₂ GUI



6- SAGE O₂ GUI



6- SAGE O₂ GUI



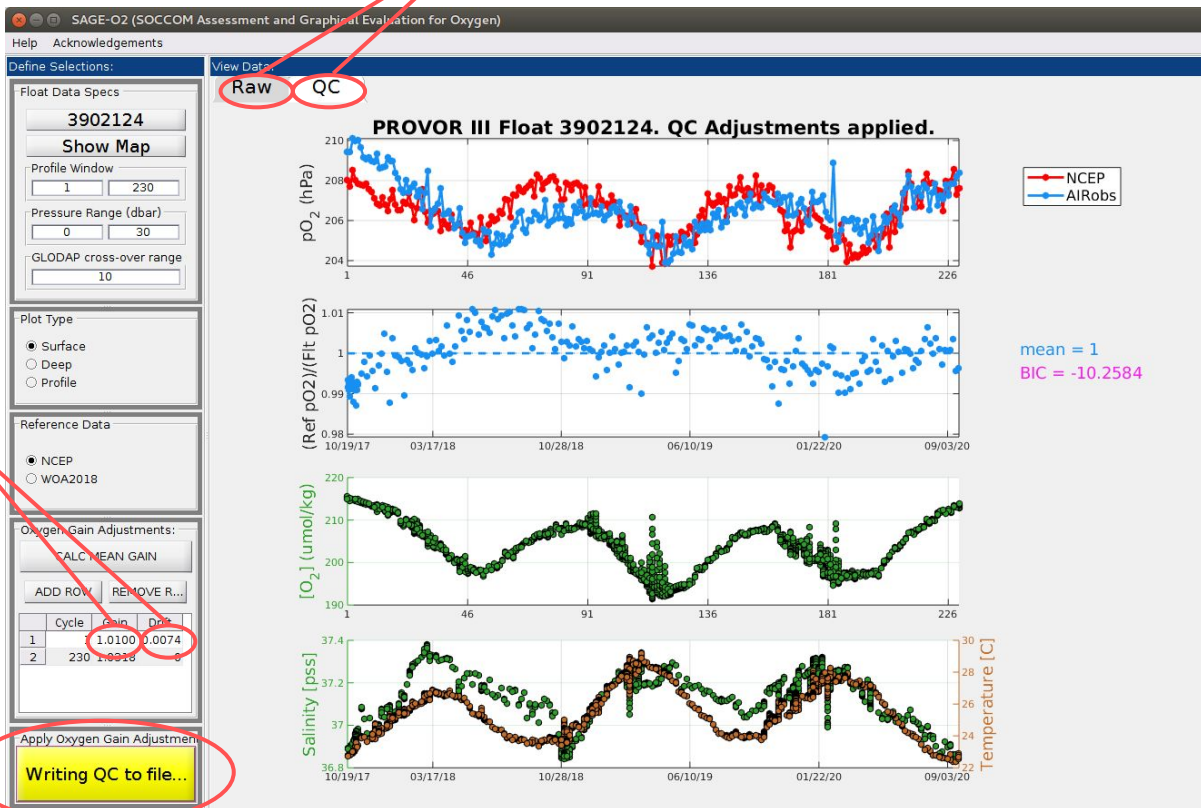
Add row and put the chosen cycle (last cycle for calculating drift and add several rows for adding breakpoints)

6- SAGE O₂ GUI

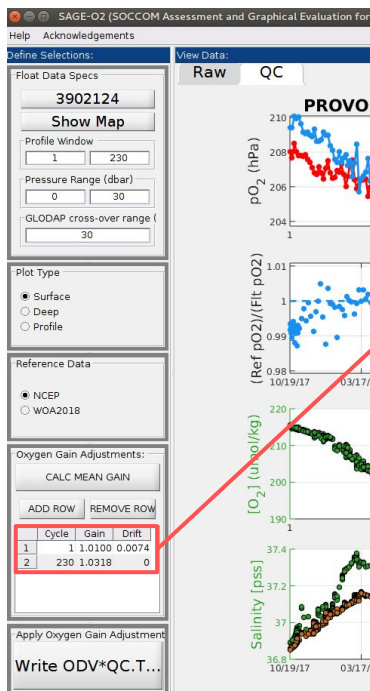
Choose to plot Raw or QC data

The gain and drift are given here

When you are happy write the results



7- Coefficients for oxygen adjustments



Cycle	Gain	Drift
1	Gain to apply from cycle 1 to 10	Drift to apply from cycle 1 to 10
10	Gain to apply from cycle 10 to 20	Drift to apply from cycle 10 to 20
20	Gain to apply from cycle 20 to ...	Drift to apply from cycle 20 to ...
...
70	xxx	0

These last values are not used to compute the oxygen gain adjustments