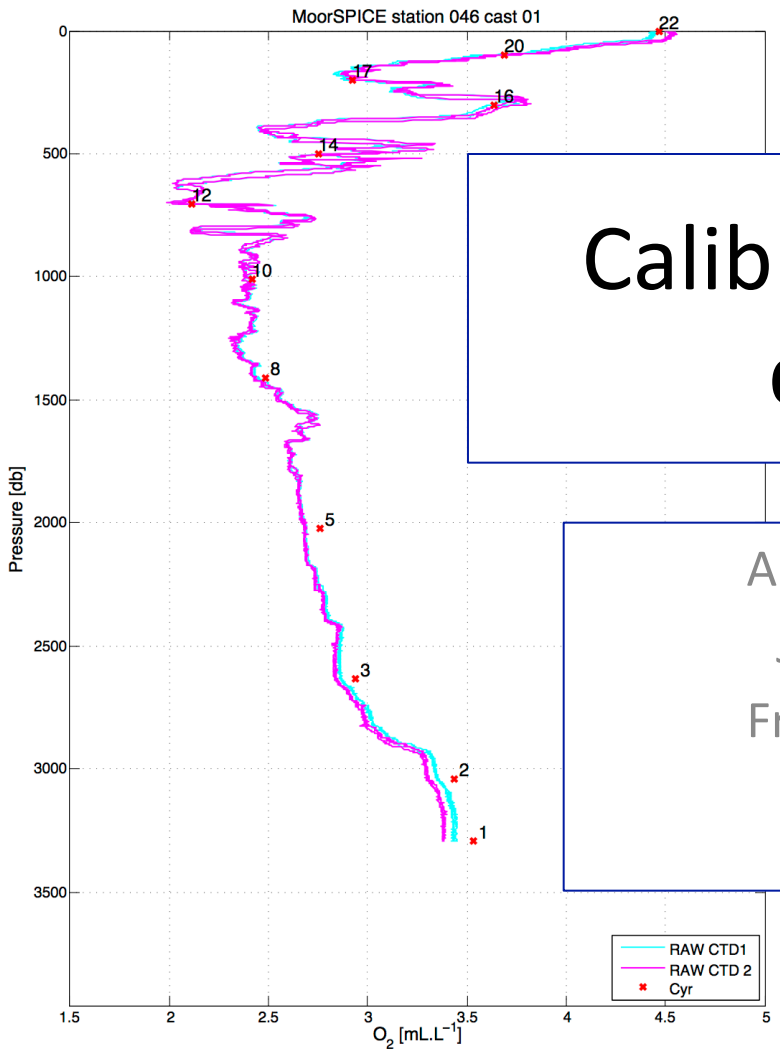
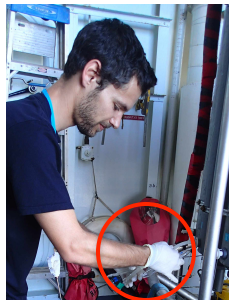


Calibration CTD-O2 et flux de données campagne

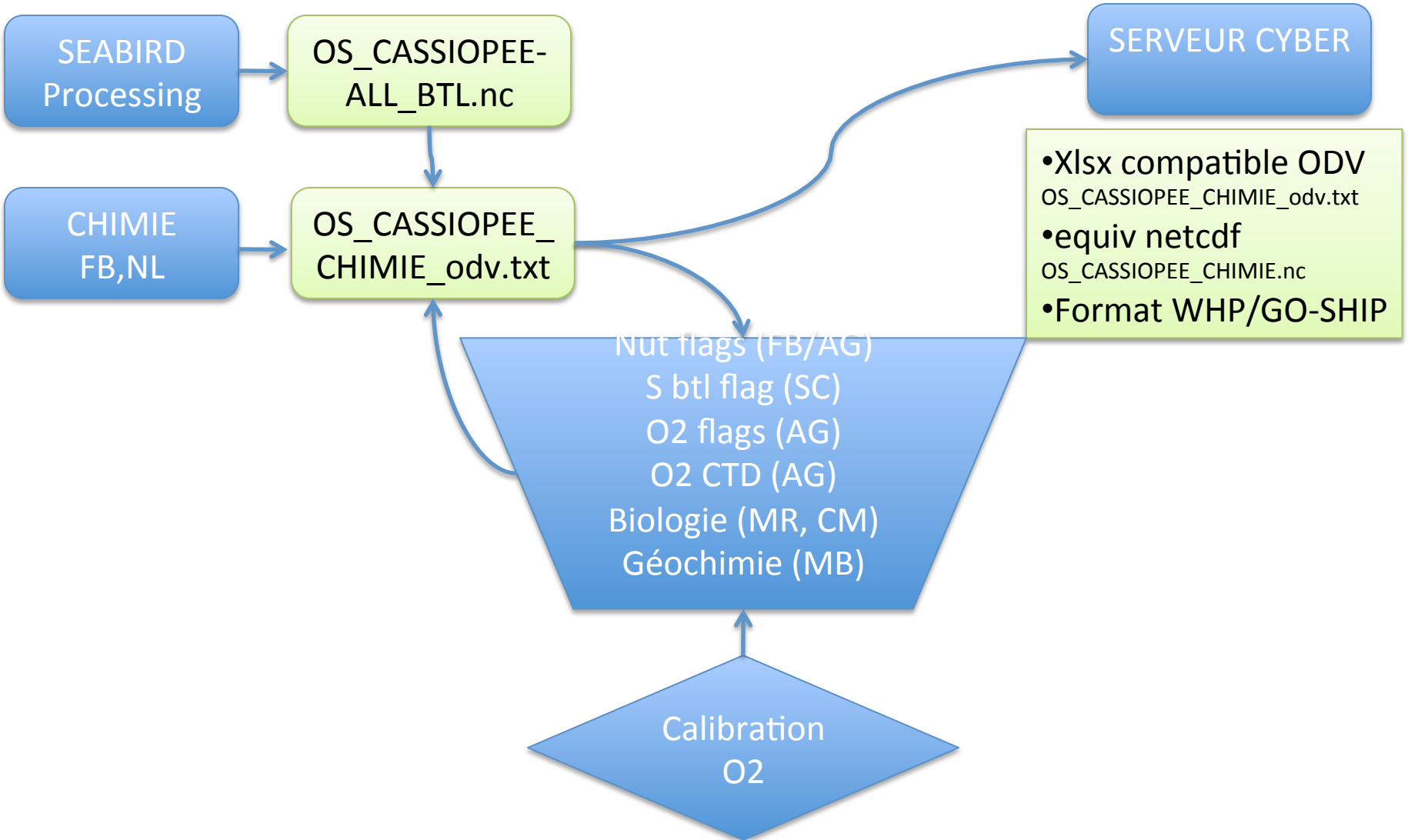
Alexandre Ganachaud (IRD-LEGOS)
Jacques Grelet (IRD, US-IMAGO)
François Baurand (IRD, US-IMAGO)
Carole Saout-Grit (Glazéo)



Références

- **Ushida**, H., GC Johnson and KE McTaggart 2010. CTD oxygen sensor calibration procedures. In: Swift, J. H., 2010. IOCCO Report 14, ICPO Publication series No 134 (http://www.go-ship.org/HydroMan.html).
- **Saout-Grit**, C., A. Ganachaud, C. Maes, L. Finot, L. Jamet, F. Baurand and J. Grelet, 2015 : Calibration of CTD oxygen data collected in the Coral Sea during the 2012 Bifurcation cruise, 52 (3), 34-38, http://mercator-ocean.fr/

1-Données *bouteilles*

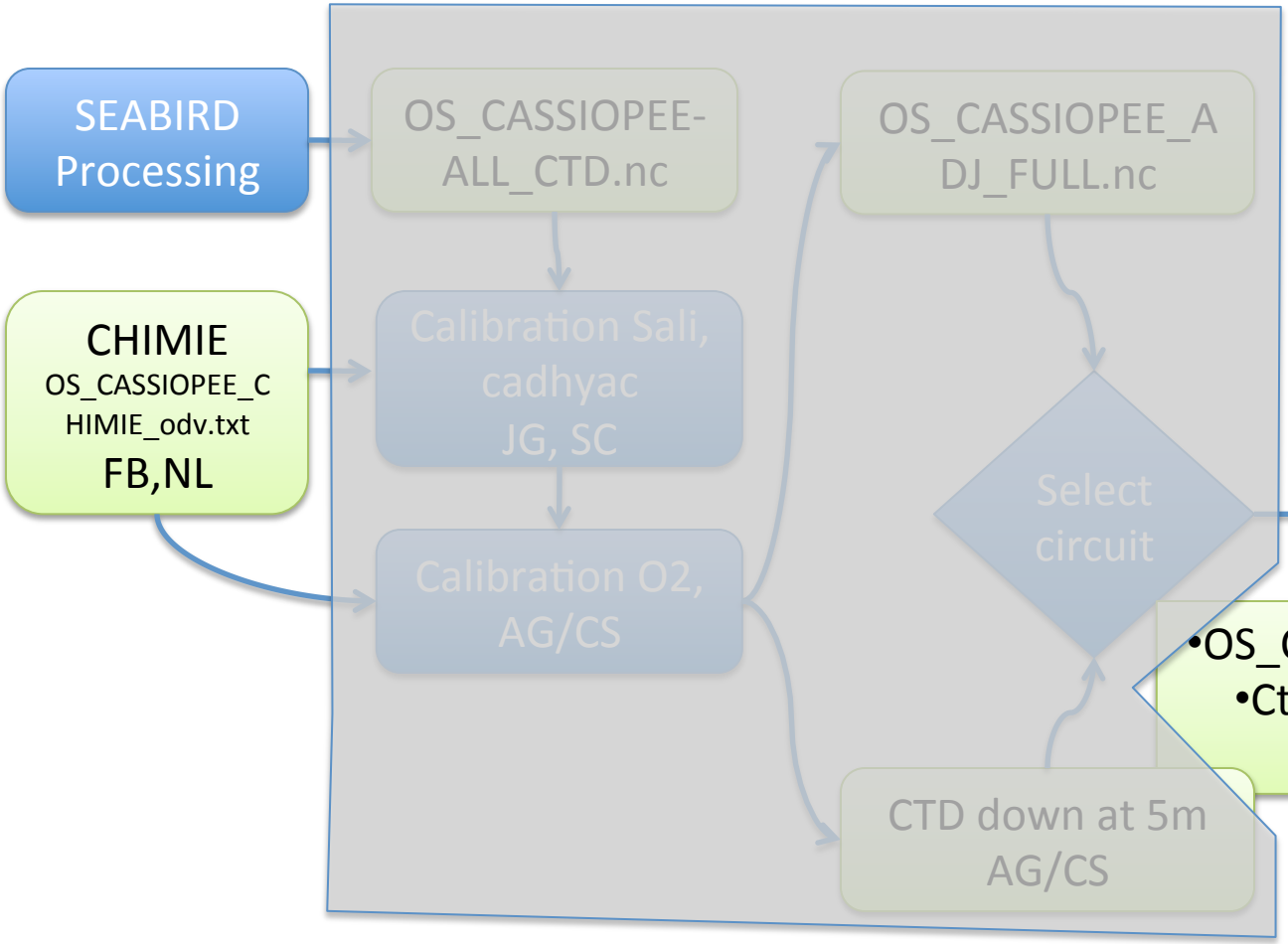


OS_CASSIOPEE_CHIMIE_odv.txt

//ODV Spreadsheet file : M:\CASSIOPEE\data-processing\CHIMIE\CASSIOPEE_CHIMIE_odv.txt
//Data treated : 2015-08-22T11:43:39
//<InstrumentType>Chemical bottle analysis</InstrumentType>
//<Source>M:\CASSIOPEE\data-processing\CHIMIE\CASSIOPEE_CHIMIE.xlsx</Sources>
//<DataType>Bottles</DataType>
//<Creator>Jacques.Grelet@ird.fr</Creator>
//

Cruise	Station	Type	yyyy-mm-ddT	Longitude [de	Latitude [degr	Bot. Depth [m	DEPTH [m]	Bottle nb	PSAL [Psu]	DOX1 [ml/l]	DOX2 [microm	NTIW [microm	NTRI_Q
CASSIOPEE	st001c01	B	2015-07-20T0	+168.007	-19.972		1004.0	22	34.455	3.923	170.69	0.00	
CASSIOPEE	st001c01	B	2015-07-20T0	+168.007	-19.972		1004.0	21	34.456	3.923	170.66	0.00	
CASSIOPEE	st001c01	B	2015-07-20T0	+168.007	-19.972		1004.0	20	34.455	3.922	170.60	0.00	
CASSIOPEE	st001c01	B	2015-07-20T0	+168.007	-19.972		1004.0	19	34.455	3.918	170.42	0.00	
CASSIOPEE	st001c01	B	2015-07-20T0	+168.007	-19.972		1004.0	18	34.455	3.947	171.72	0.00	
CASSIOPEE	st001c01	B	2015-07-20T0	+168.007	-19.972		1004.0	17	34.455	3.926	170.76	0.00	

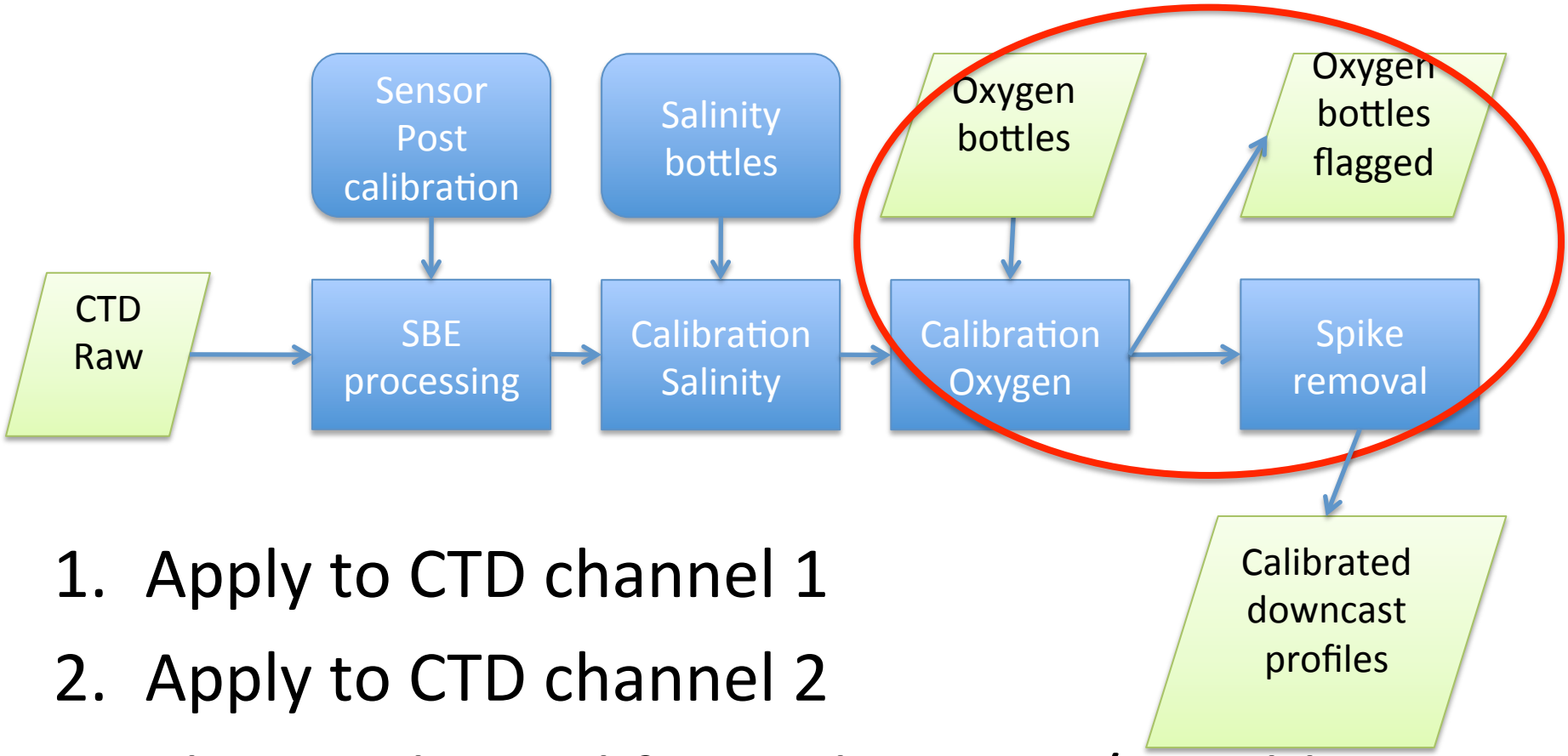
2-*Profils* CTD et Calibration



Contient:
- Toutes les variables CTD
- Les deux circuits

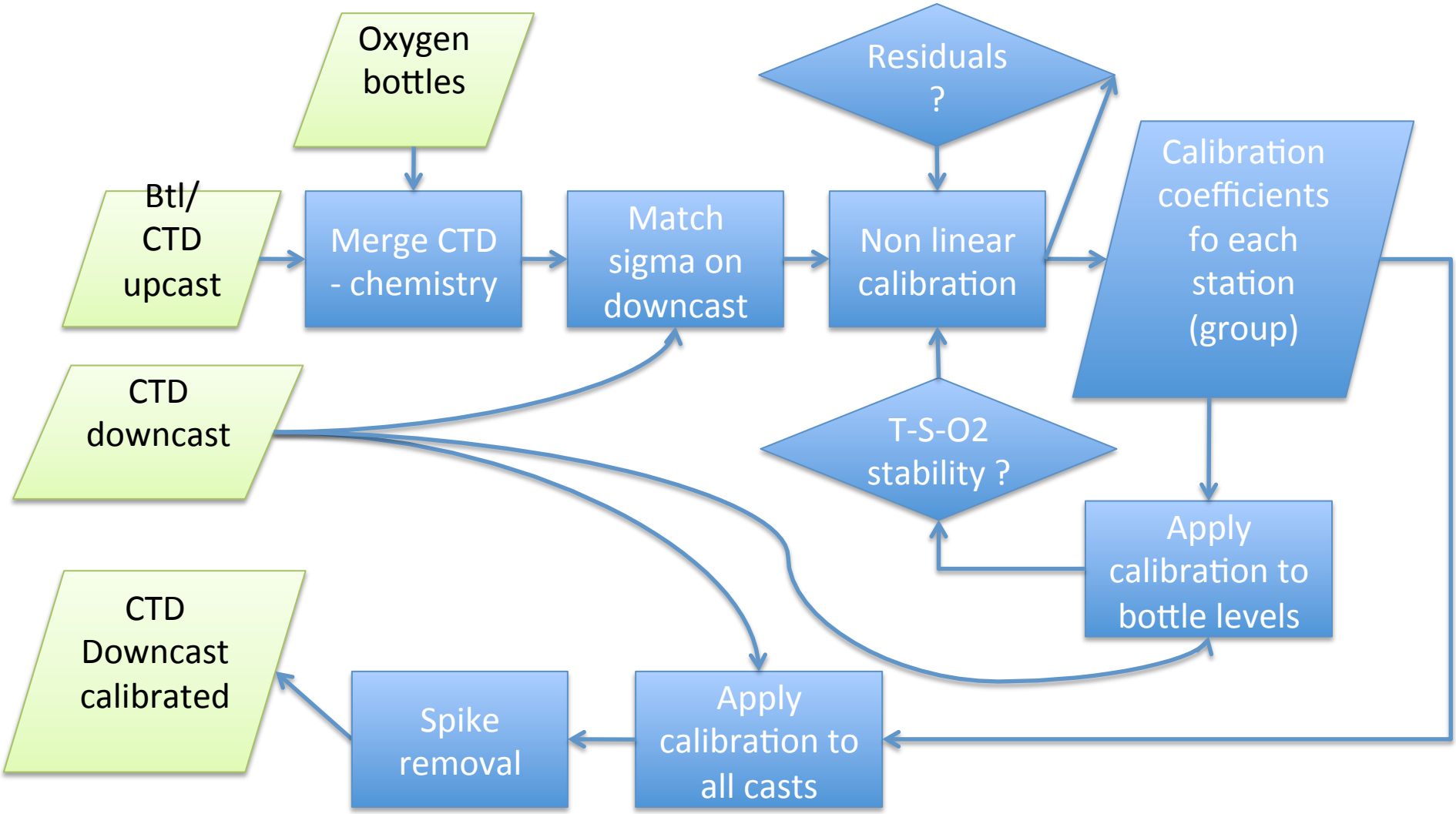
Contiennent:
- Seules les variables utiles
- Un seul circuit/profil

Procédure de calibration CTD-O2

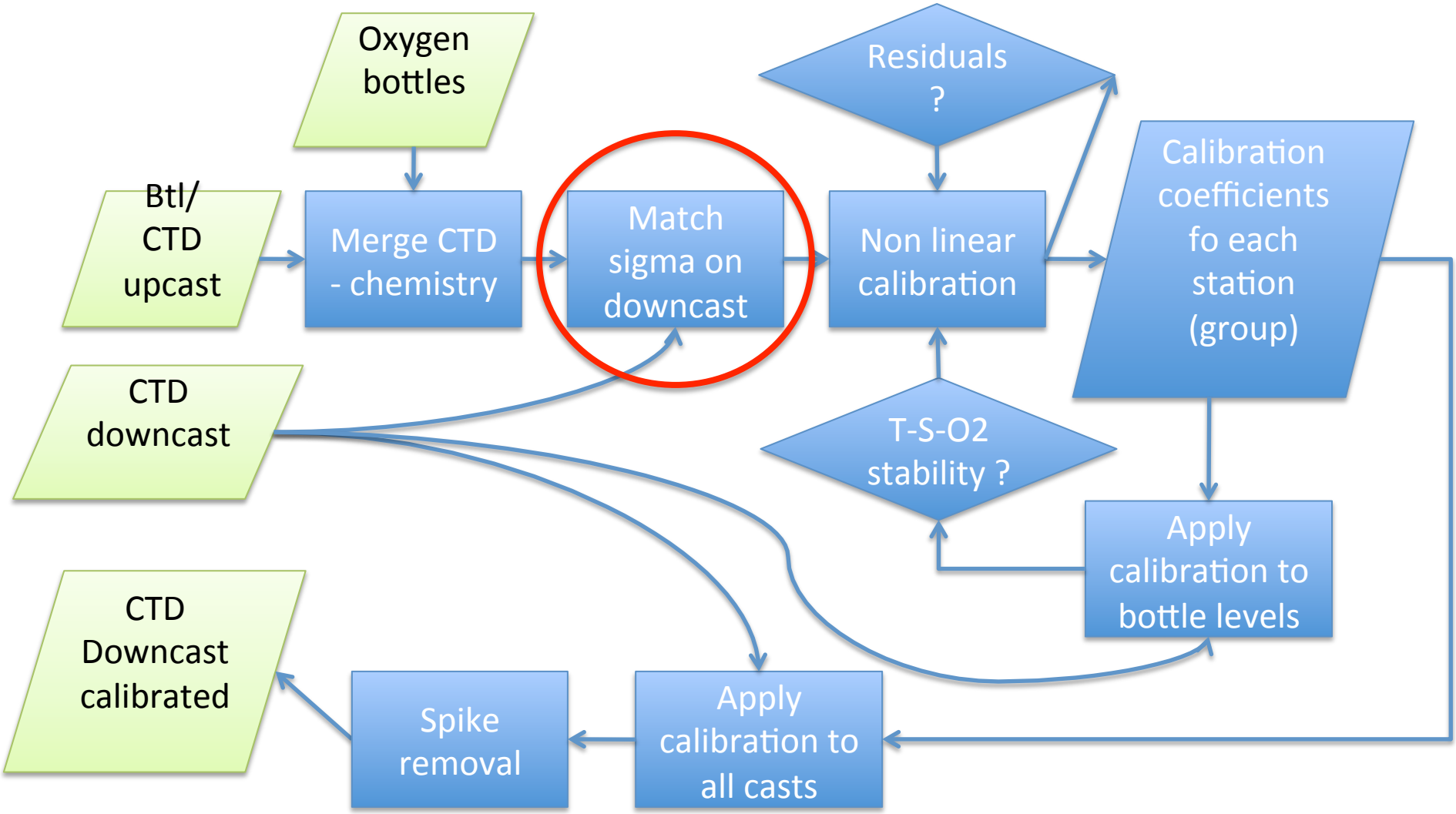


1. Apply to CTD channel 1
2. Apply to CTD channel 2
3. Choose channel for each station/variable

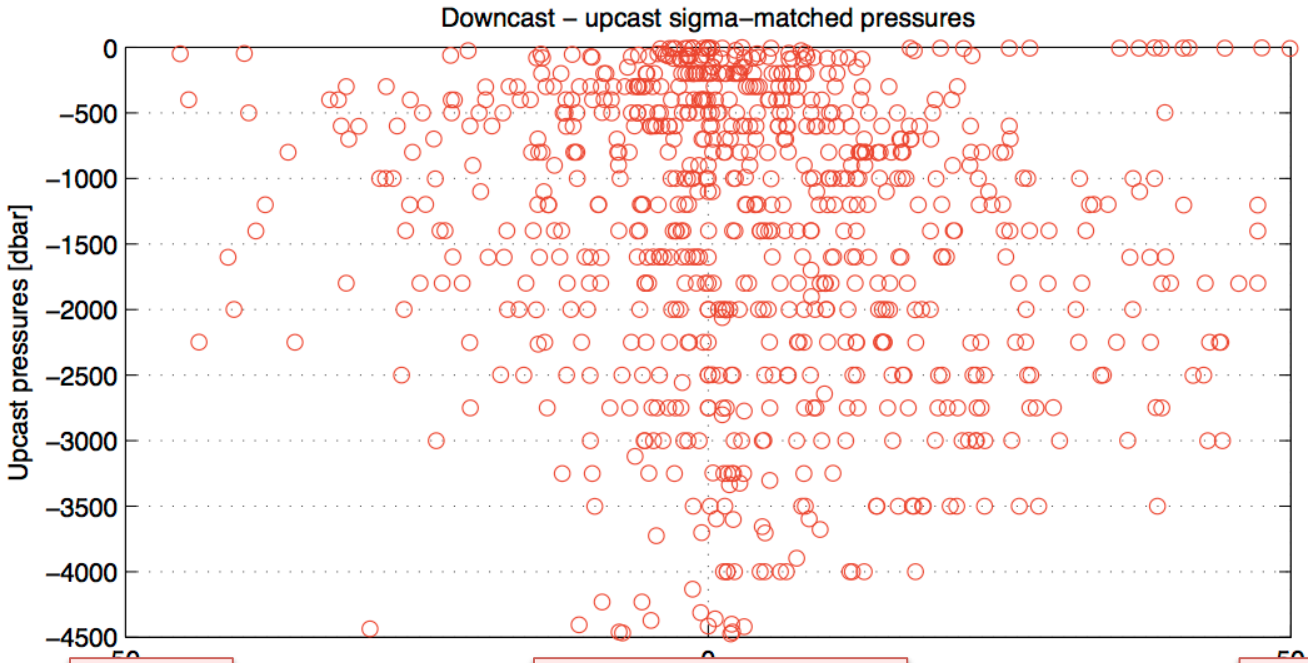
Procédure de calibration CTD-O2 (détail)



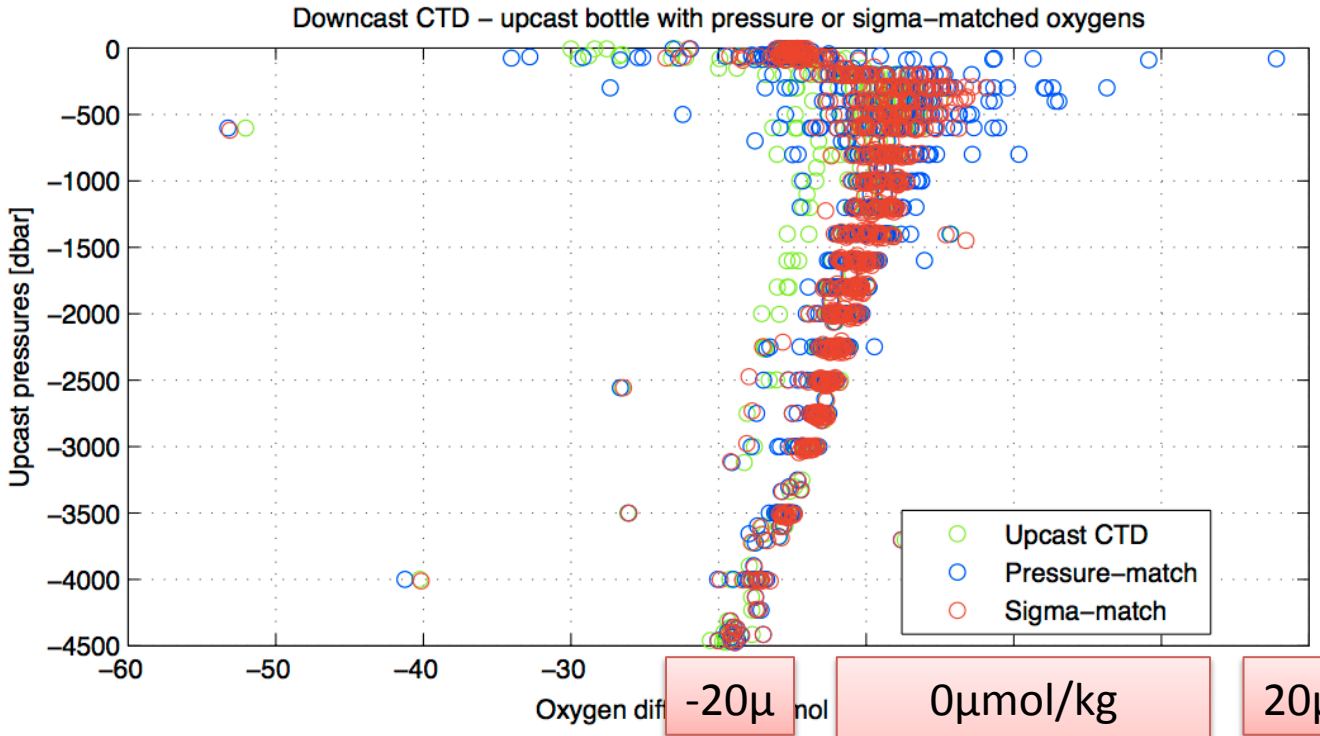
Procédure de calibration CTD-O2 (détail)



1-Ajustement en densité



1-Ajustement en densité

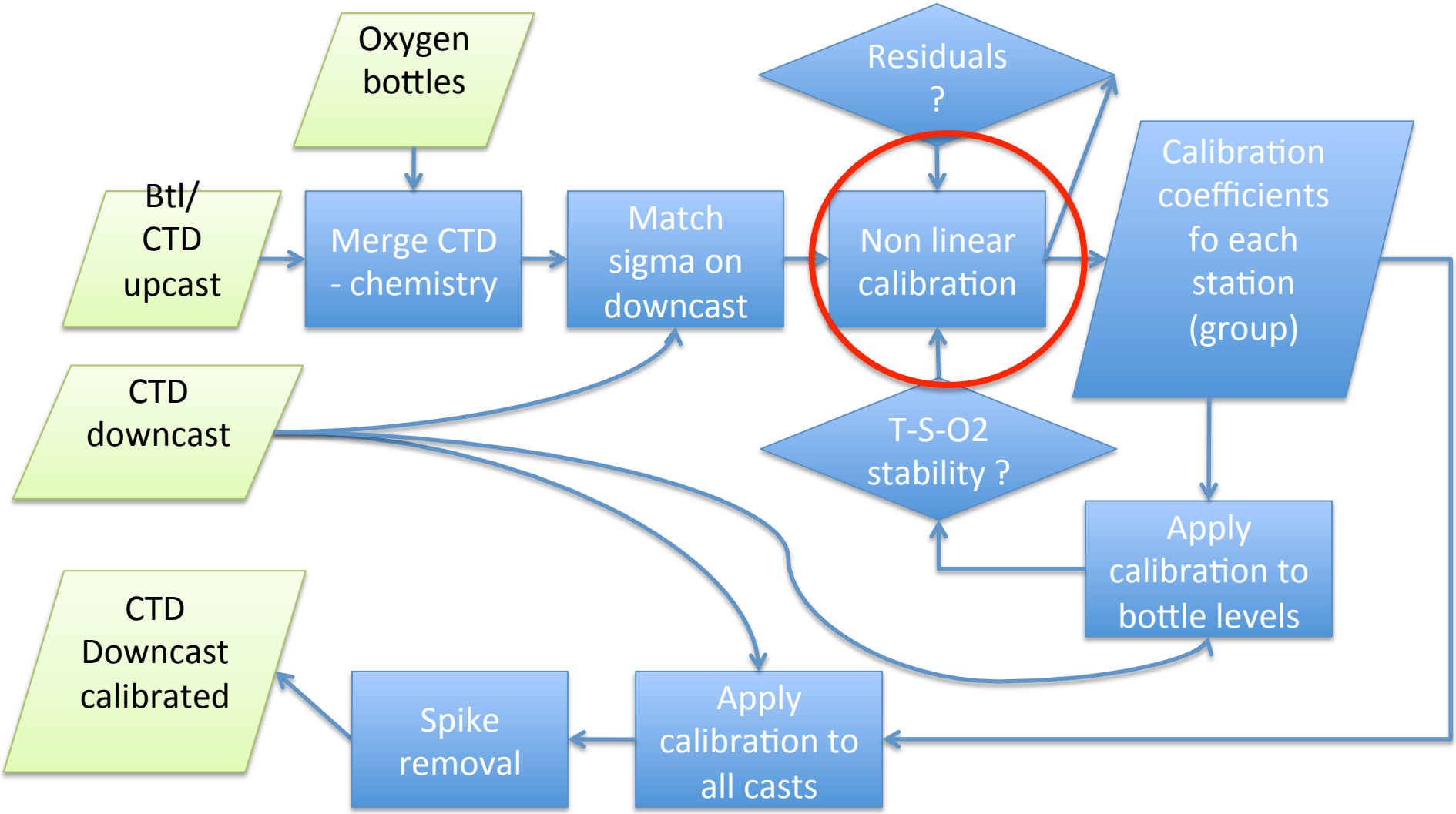


-20µ

0µmol/kg
O(down)-O(up)

20µ

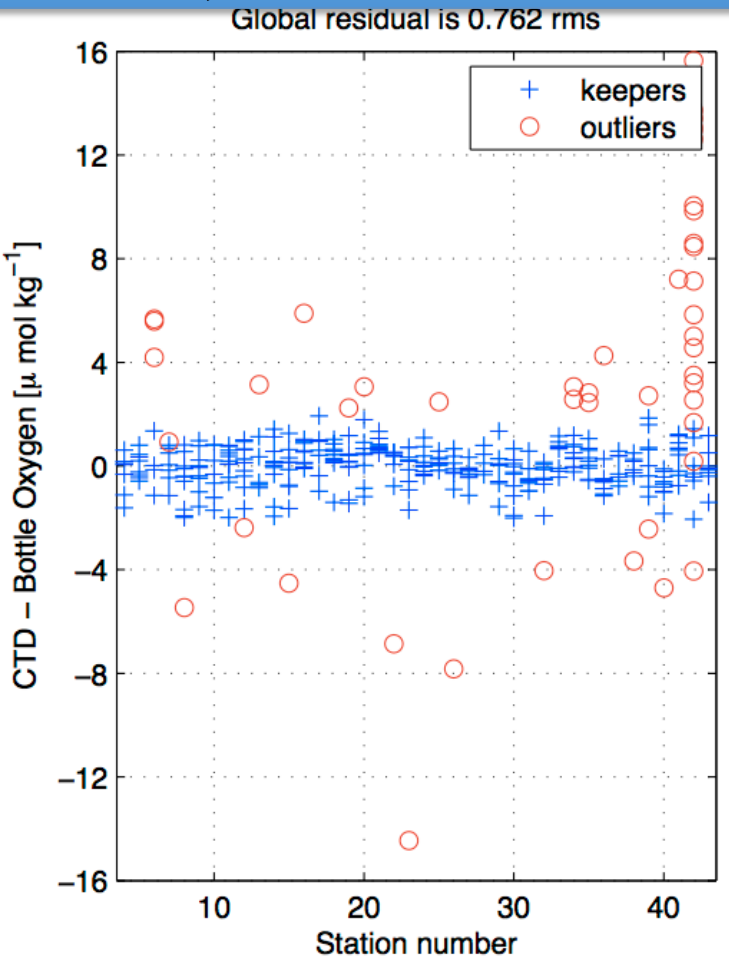
Procédure de calibration CTD-O2 (détail)

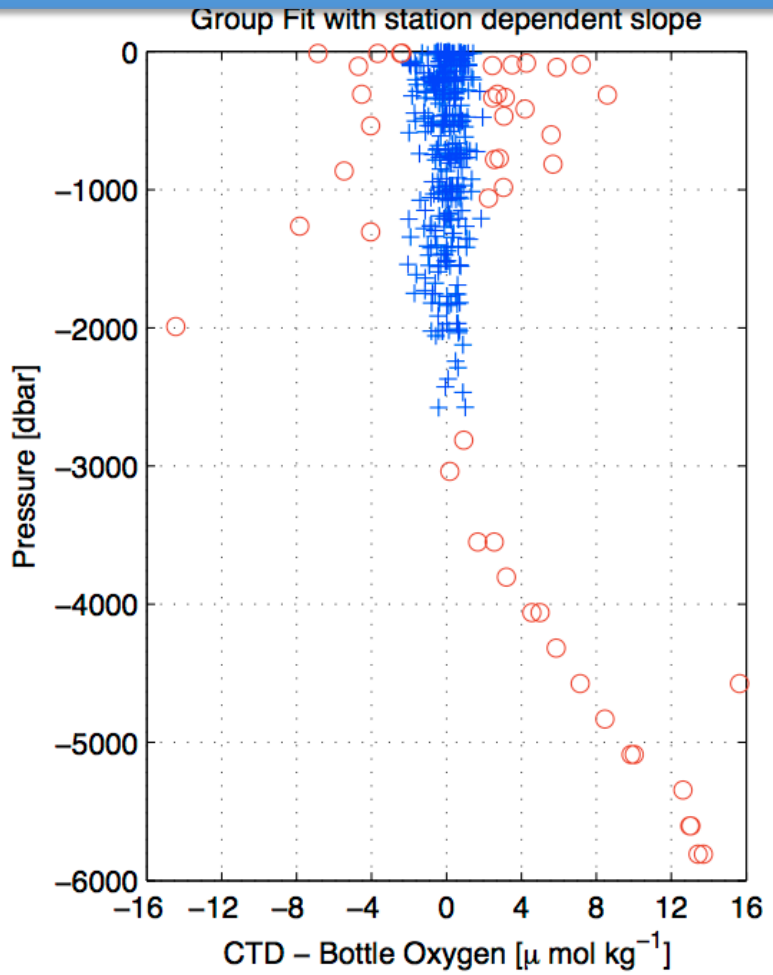


2-Détermination coefficients

$$O_2 = O_{sat} \times e^{\mathbf{T_{cor}} \times T} \times e^{\frac{\mathbf{Pcor} \times P}{273.15+T}} \times \ldots$$

$$\mathbf{Soc} * \left(O_x V + \mathbf{V_{offset}} + \tau_{20} \times e^{(D1 \times P + D2 \times T)} \times \frac{dV}{dt} \right)$$

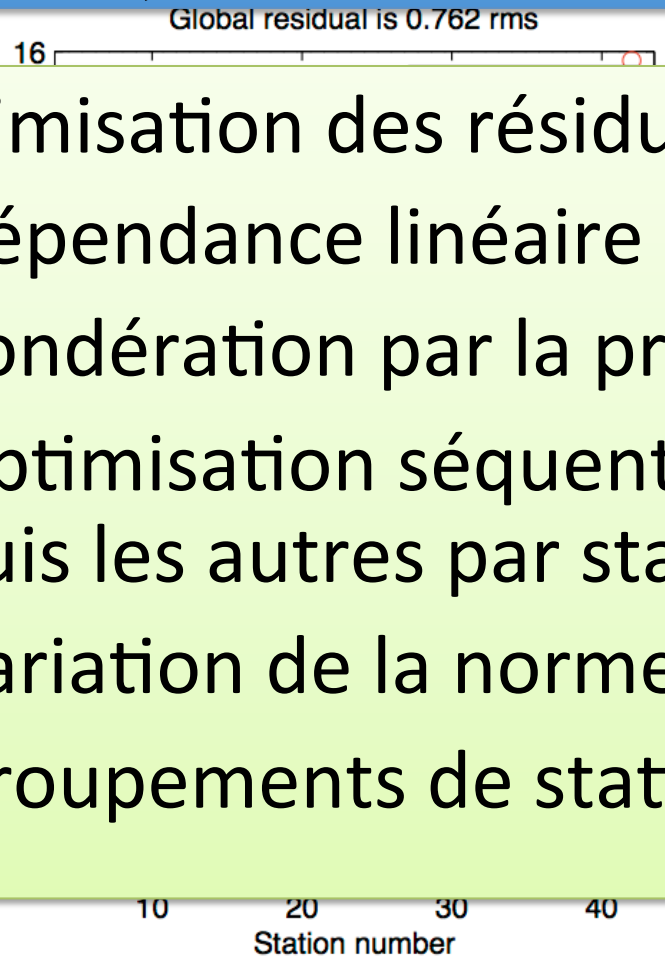


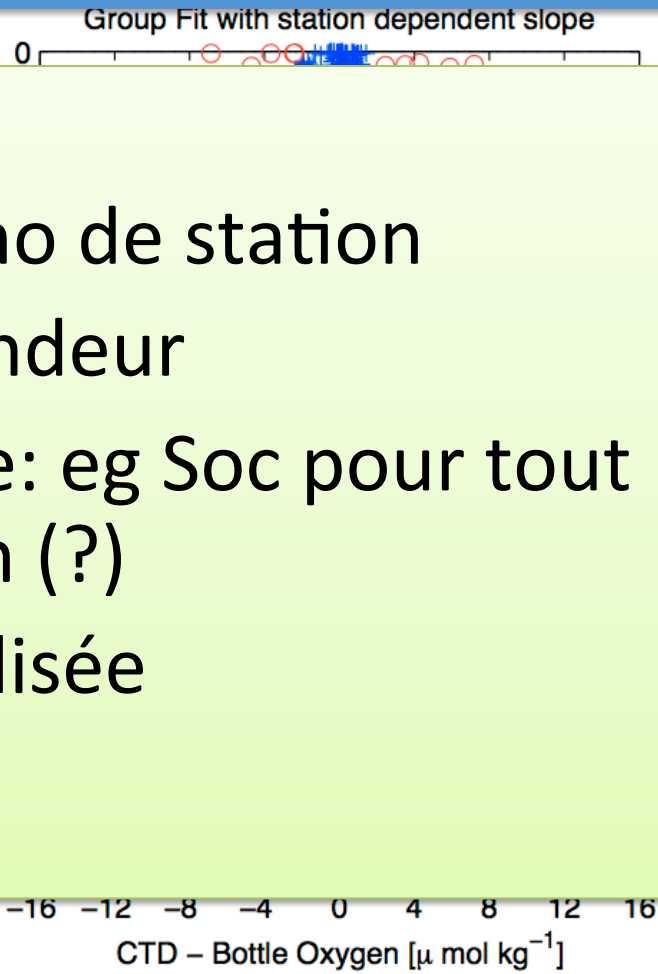


2-Détermination coefficients

$$O_2 = O_{sat} \times e^{\mathbf{T_{cor}} \times T} \times e^{\frac{\mathbf{Pcor} \times P}{273.15+T}} \times \ldots$$

$$\mathbf{Soc} * \left(O_x V + \mathbf{V_{offset}} + \tau_{20} \times e^{(D1 \times P + D2 \times T)} \times \frac{dV}{dt} \right)$$

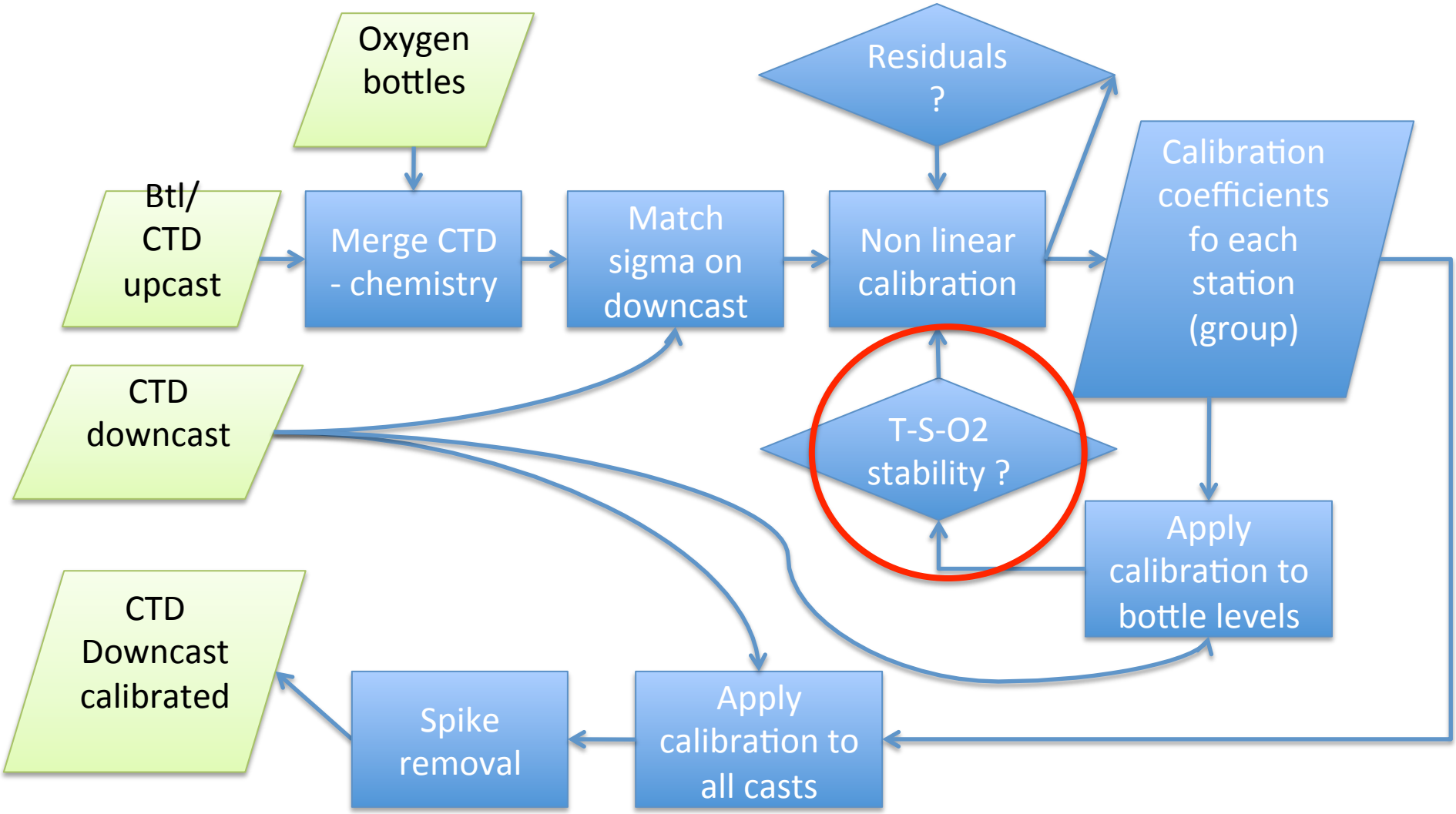




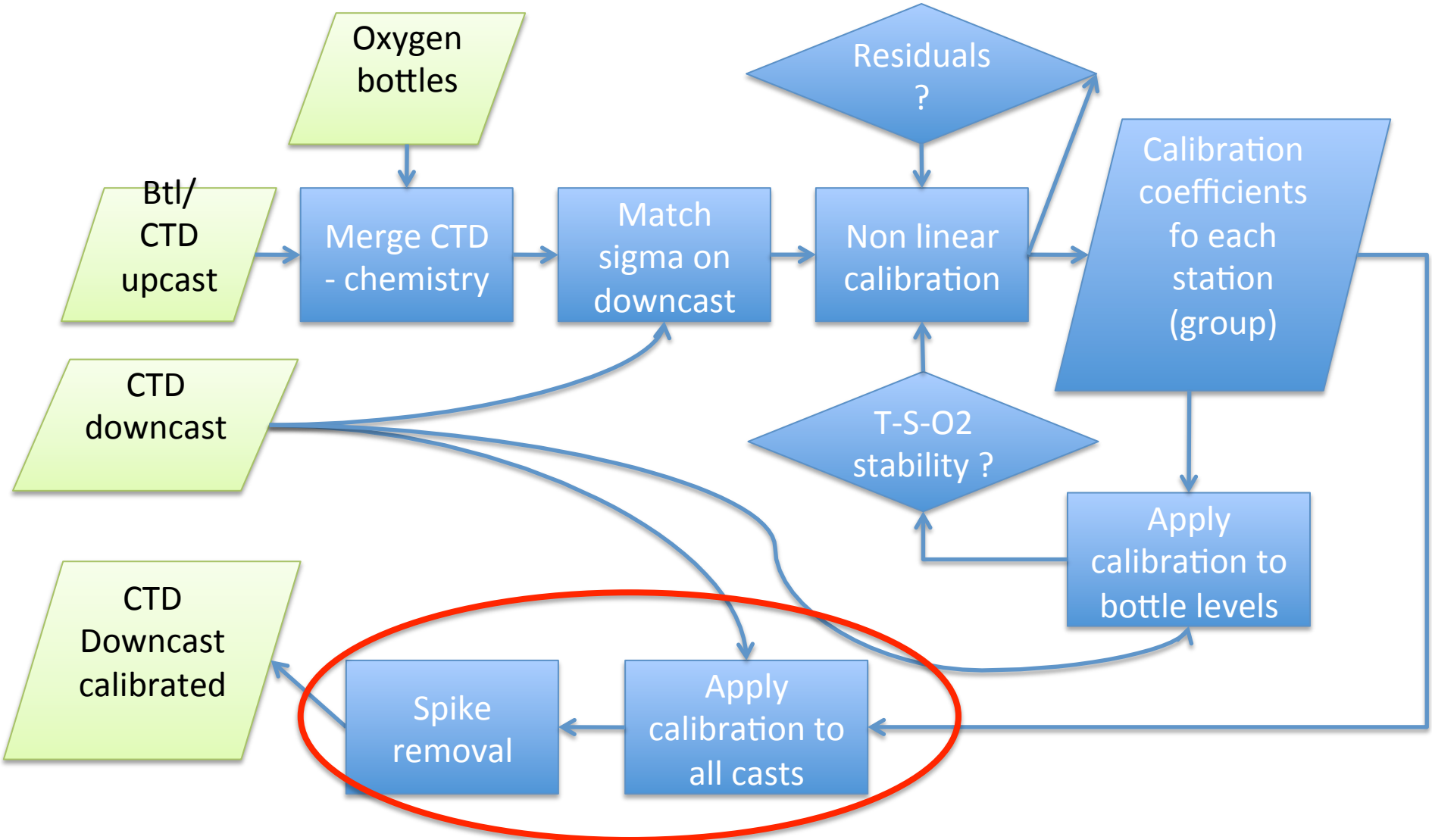
Optimisation des résidus:

- Dépendance linéaire du no de station
- Pondération par la profondeur
- Optimisation séquentielle: eg Soc pour tout puis les autres par station (?)
- Variation de la norme utilisée
- Groupements de stations

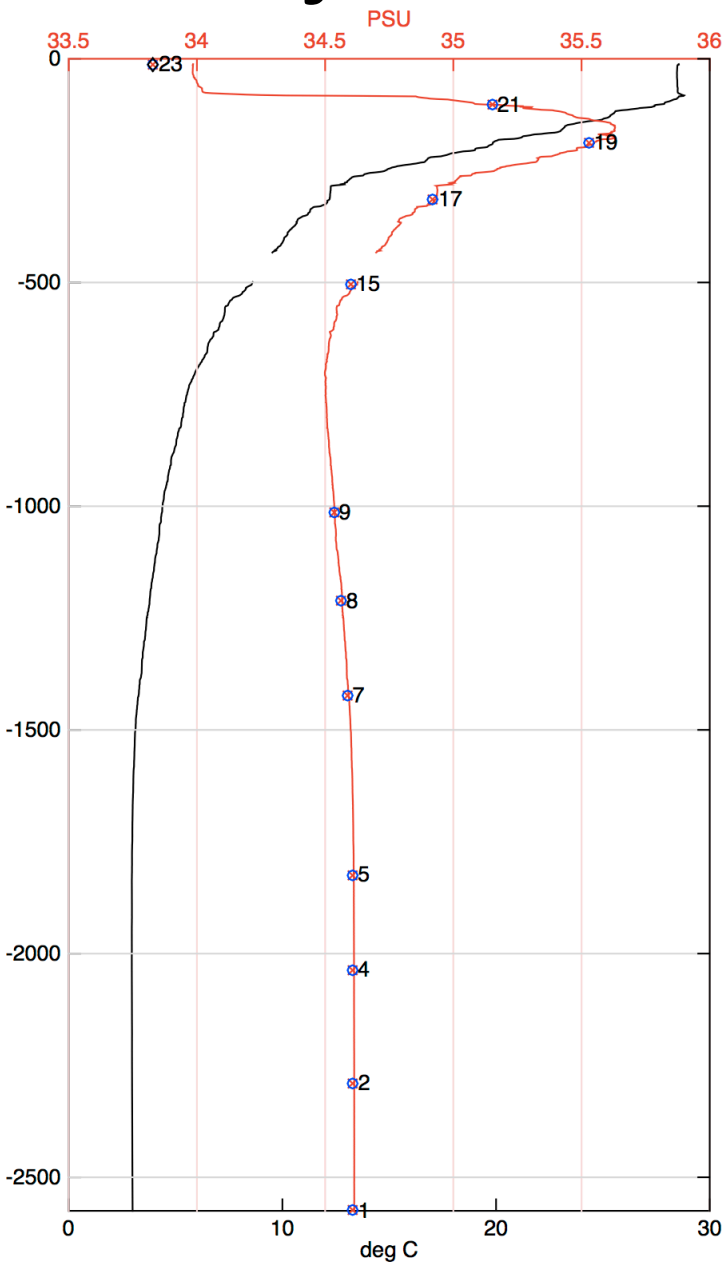
Procédure de calibration CTD-O2 (détail)

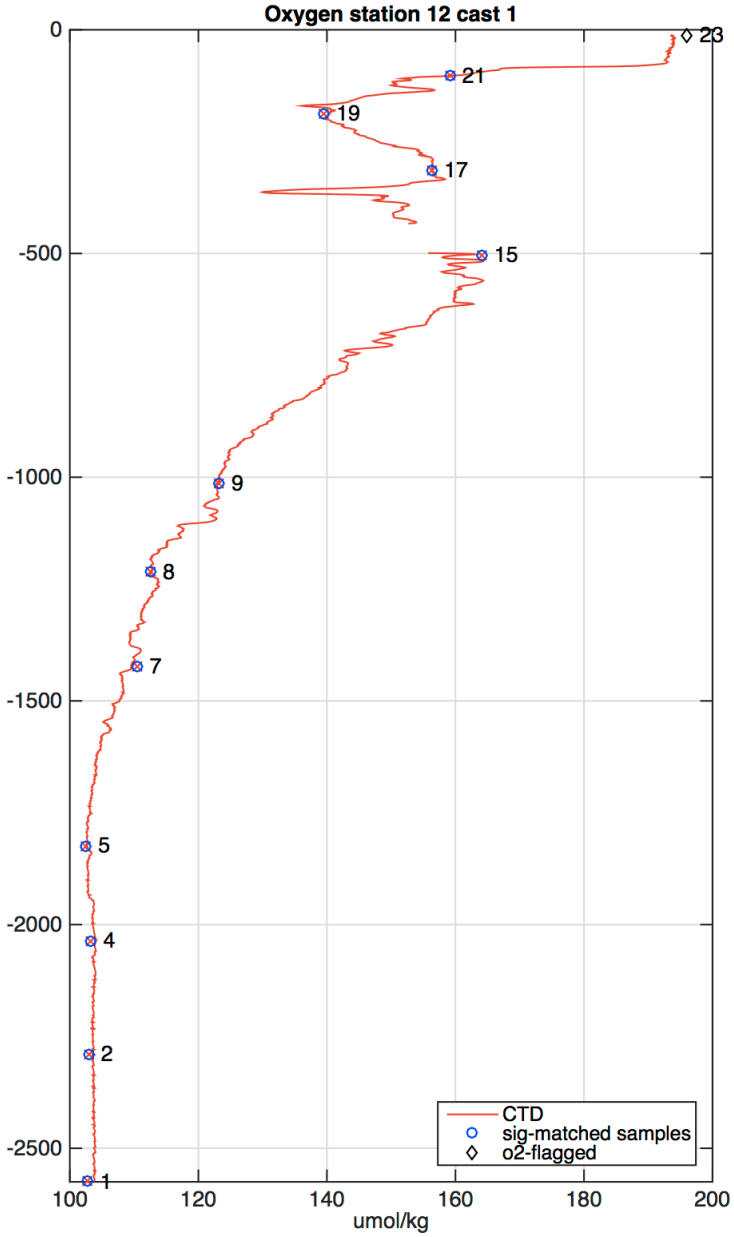


Procédure de calibration CTD-O2 (détail)

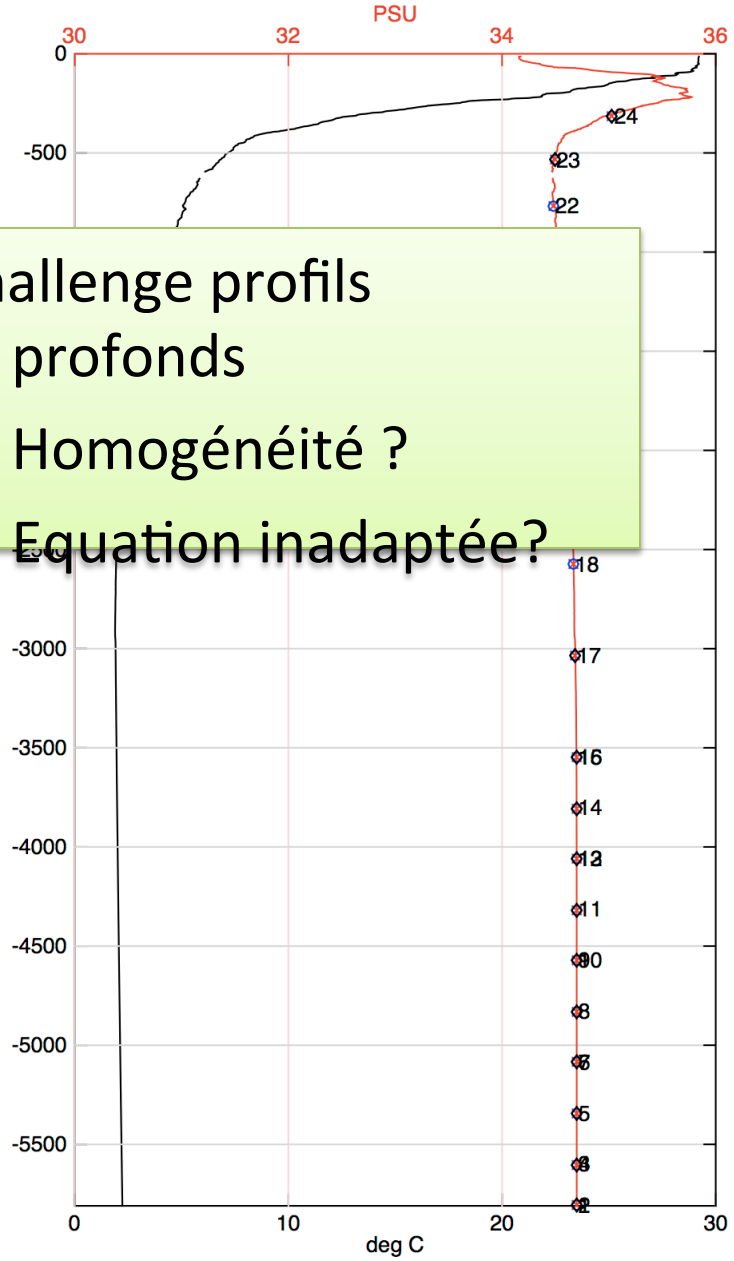


Ajustement/nettoyage



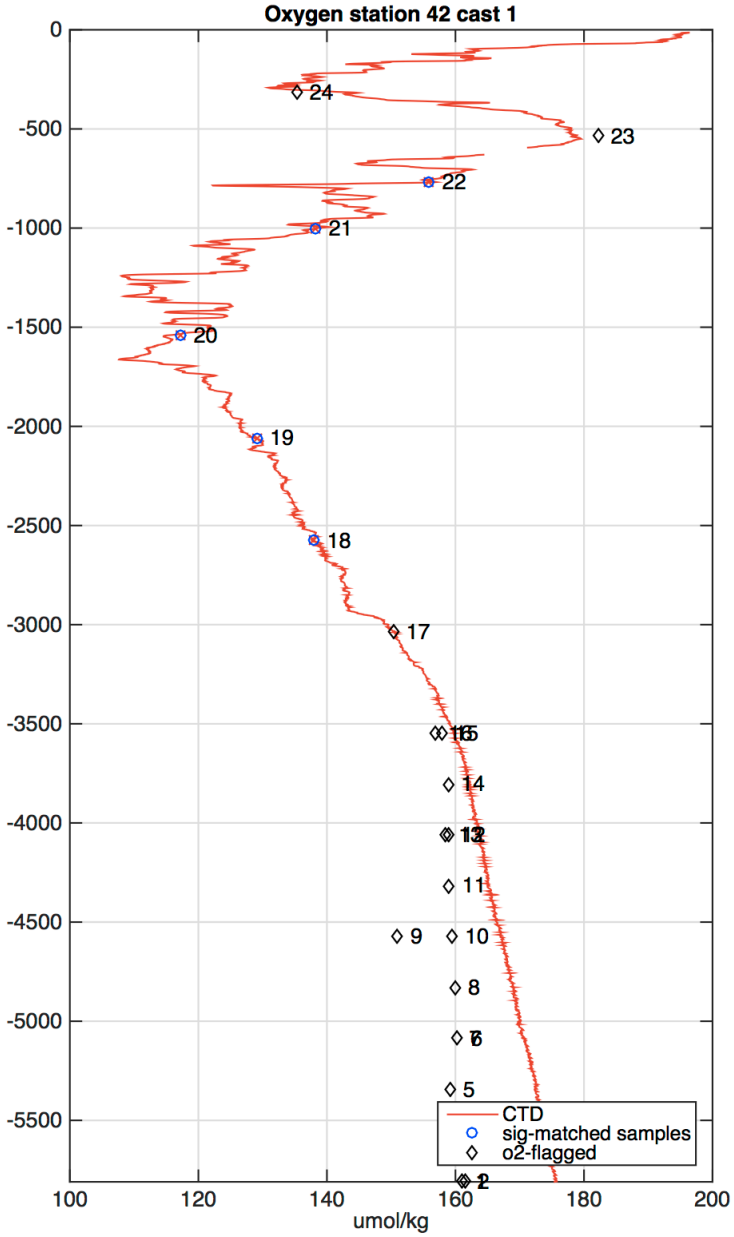


Ajustement/nettoyage

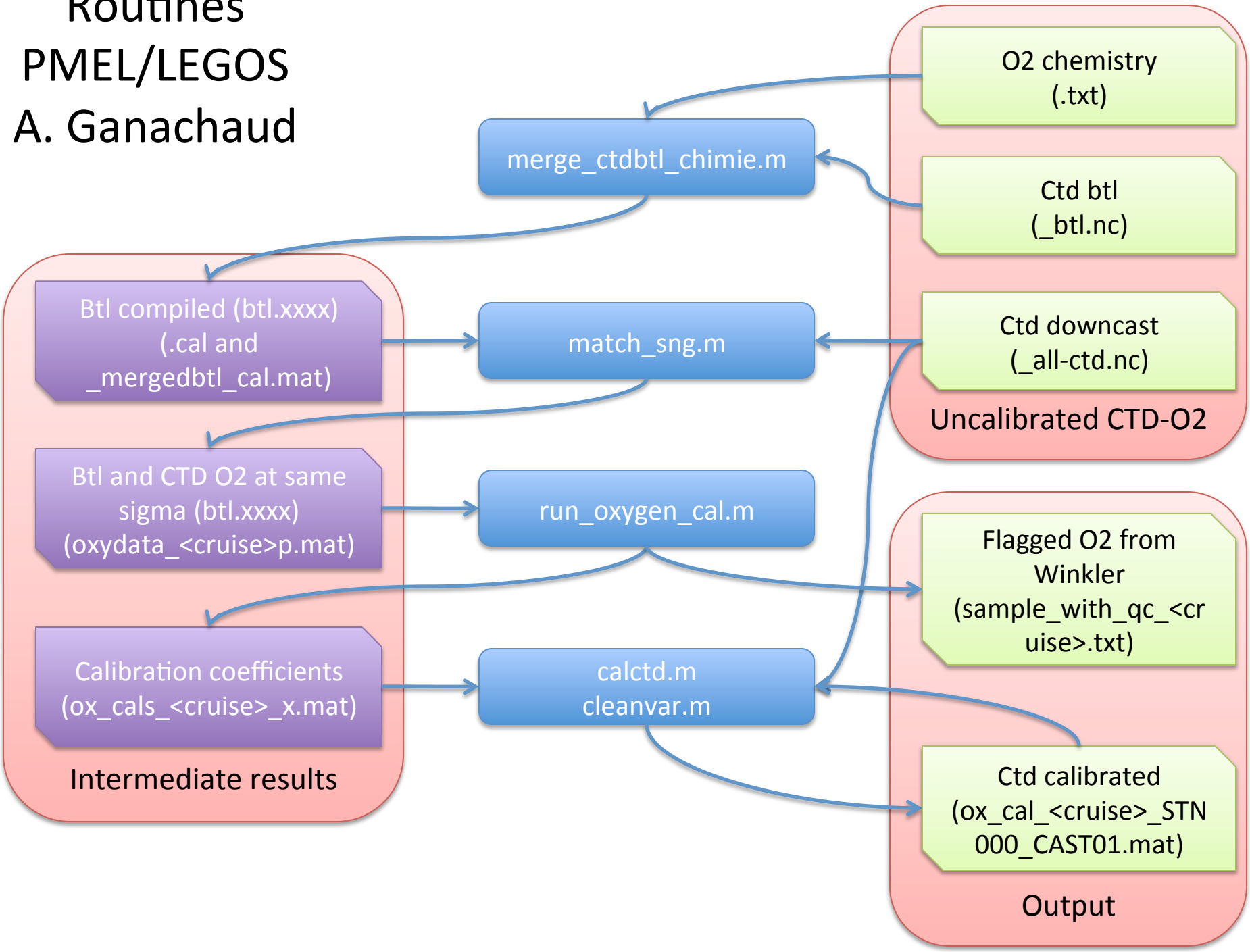


Challenge profils profonds

- Homogénéité ?
- Equation inadaptée?



Routines
PMEL/LEGOS
A. Ganachaud



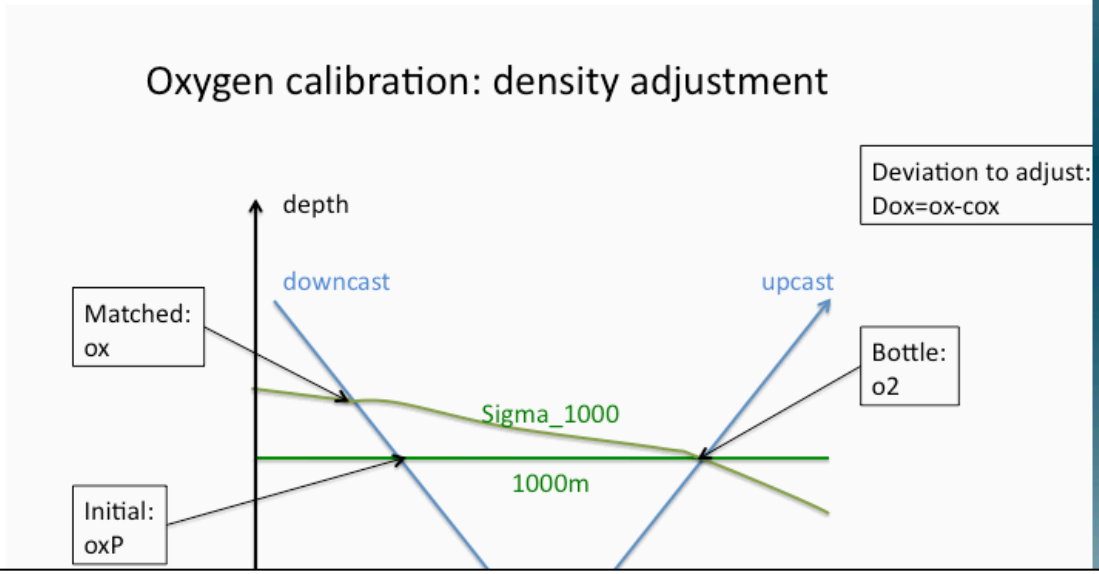
Website, log, software

Step 1: merge_ctdbtl_chimie.m

%FOR GIVEN STATION GROUP:
% READ ROSETTE FILE (.BTL or _btl.nc)
% READ OXYGEN EXCEL SHEET
% FIND BOTTLE CLOSE TO ROSETTE1 BOTTLE and ASSOCIATE O2 (WARNING IF 2 CLOSE BOTTLES OR NO MATCH)
%WRITE .CAL and _cal.mat bottle files with all stations for match_sgn

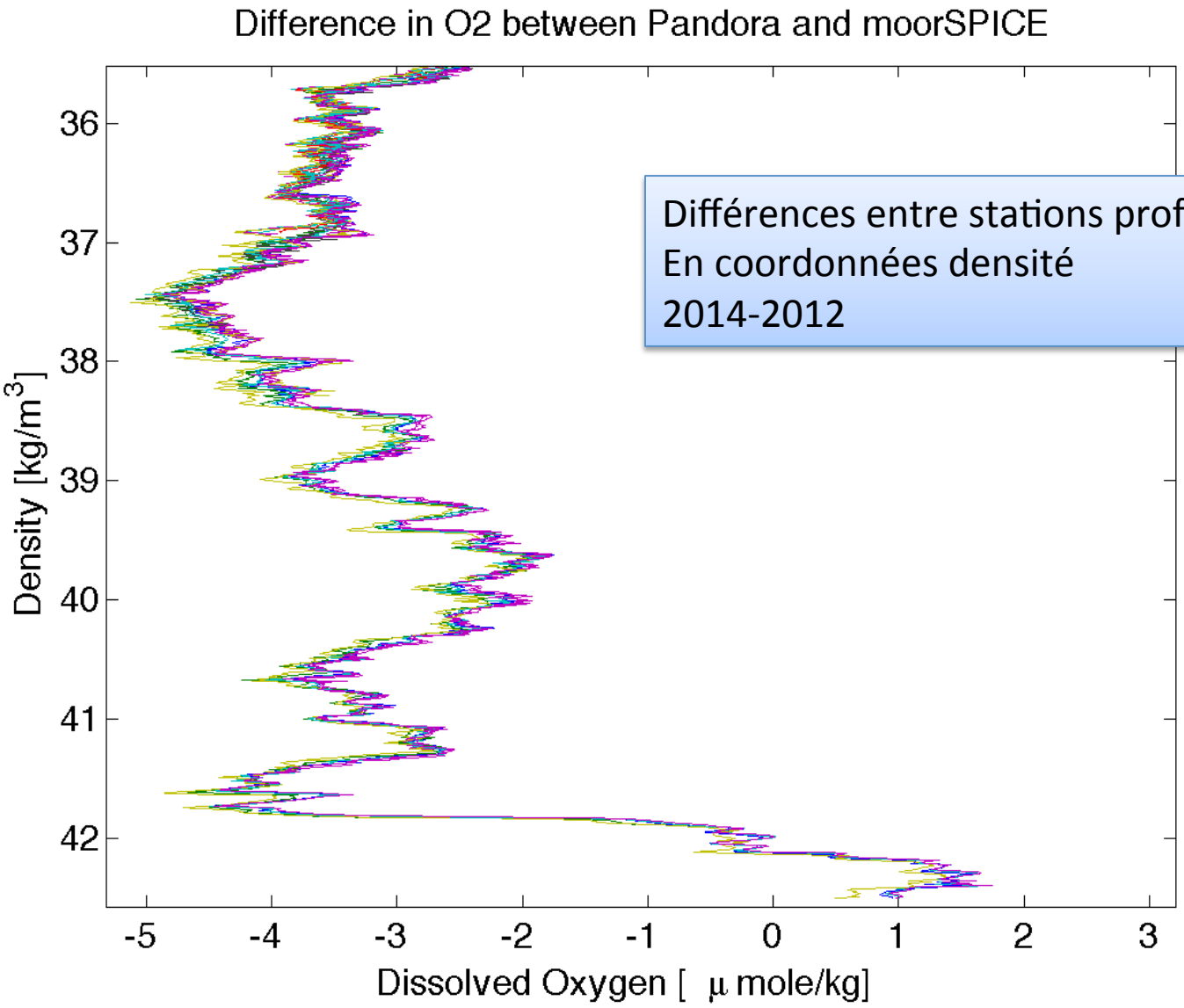
- **Input**:
  - This uses read_xls_o2.m to read xls file. For PANDORA, each xls contained group of 10 stations
  - Uses the .btl files with ctd rosette information (e.g., pandora_btl.nc)
- **Output**: "cal" file with all samples/rosette info: both ascii (.cal) and mat (_cal). Ascii has each column as follows:
  - btl.stat=p(:,1); %station
  - btl.cast=p(:,2); %cast
  - btl.btlid=p(:,3);%bottle id
  - btl.upres=p(:,4); %u = up ctd pressure
  - btl.utemp68=p(:,5);% up ctd temperature
  - btl.bsali=p(:,6); %salinity from samples
  - btl.usali=p(:,7); % up ctd salinity
  - btl.flask=p(:,8); %flacon id
  - btl.uoxv=p(:,9); %up ctd o2 voltage
  - btl.uoxum=p(:,10); %up ctd o2 umol/kg
  - btl.wnklo2um=p(:,11); %oxygen from samples (umol/kg)

Step 2: match_sgn.m



- http://www.legos.obs-mip.fr/ganachaud/restricted/oxygen-calibration/scripts
- Accès: aginvited / swpac

Intercalibration between cruises ?



Différences entre stations profondes communes
En coordonnées densité
2014-2012