Note of Delayed Mode Quality Control
of Argo float WMO 3901908

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This note includes the results of OWC performed for the WMO 3901908 float. The reference dataset used is composed of the following CTD and Argo historical datasets:

CTD:
CMEMS:

- INSITU_MED_PHYBGCWAV_DISCRETE_MYNRT_013_035
- Coriolis: CTD_for_DMQC_2024V01
- Historical CTD profiles provided through personal contact

Argo:

- ARGO_for_DMQC_2025V03

Float 3901908 is the Arvor float, where the pressure sensor is auto corrected and no adjustment is required.
The OWC was run to estimate a salinity offset and a salinity drift (Cabanes et al., 2016).

Configurations

Parameters	Value
CONFIG_MAX_CASTS	300
MAP_USE_PV	1
MAP_USE_SAF	0
MAPSCALE_LONGITUDE_LARGE	4
MAPSCALE_LONGITUDE_SMALL	1.33
MAPSCALE_LATITUDE_LARGE	4
MAPSCALE_LATITUDE_SMALL	1.33
MAPSCALE_PHI_LARGE	0.5
MAPSCALE_PHI_SMALL	0.1
MAPSCALE_AGE	10
MAP_P_EXCLUDE	700
MAP_P_DELTA	250

OWC Results

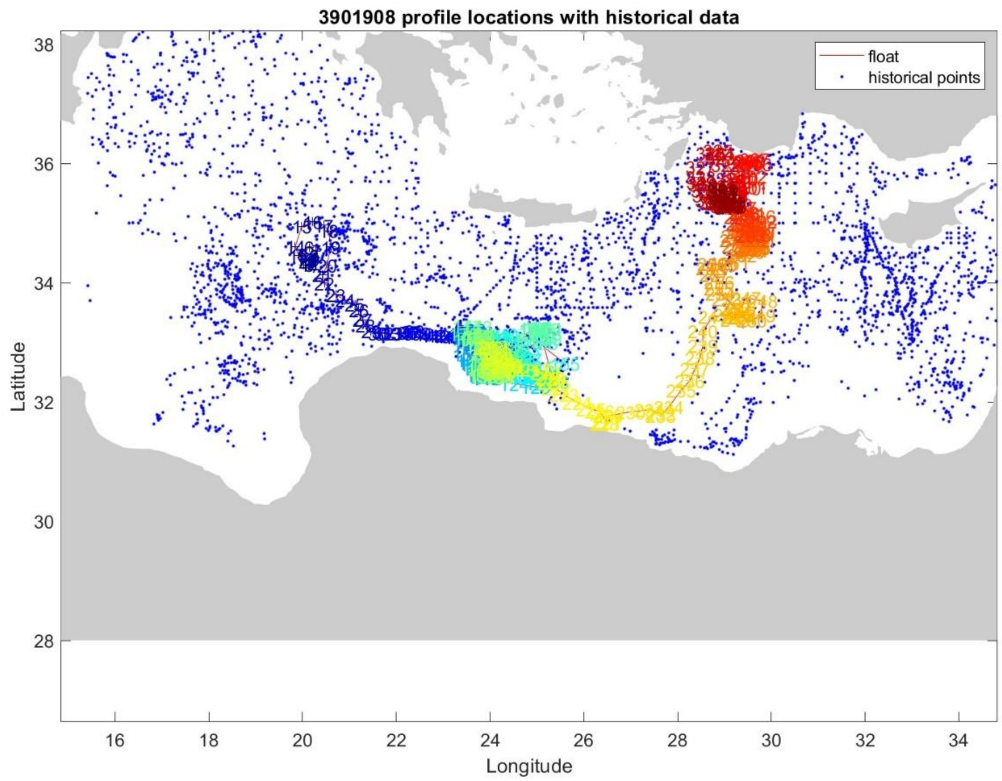

Figure 1: Location of the float profiles (red line with colored numbers) and the reference data selected for mapping (blue dots).

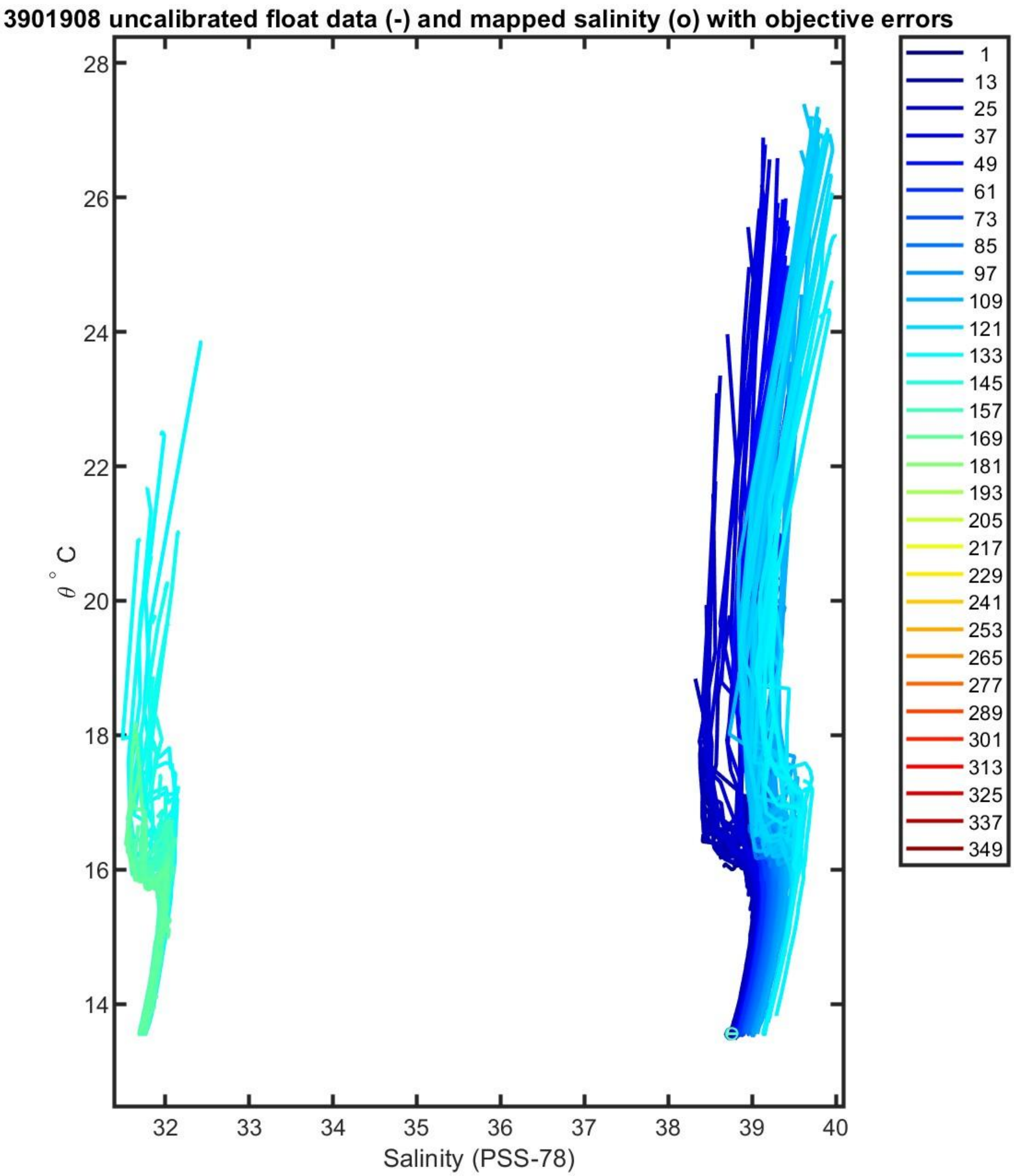

Figure 2: Plot the original float salinity and the objectively estimated reference salinity at the 10 float theta levels that are used in calibration.

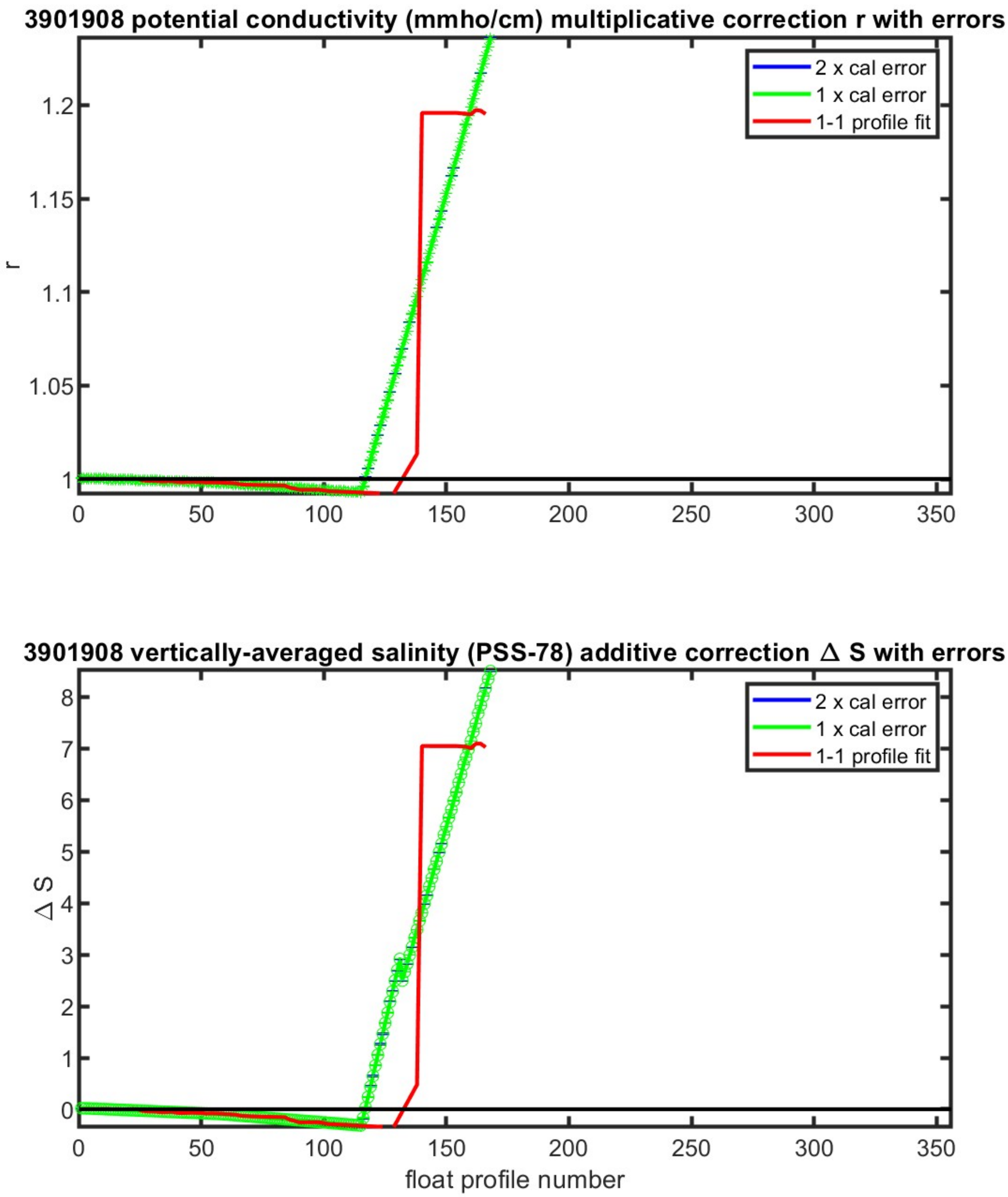

Figure 3: Evolution of the suggested adjustment with time. The top panel plots the potential conductivity multiplicative adjustment. The bottom panel plots the equivalent salinity additive adjustment. The red line denotes one-to-one profile fit that uses the vertically weighted mean of each profile. The red line can be used to check for anomalous profiles relative to the optimal fit.

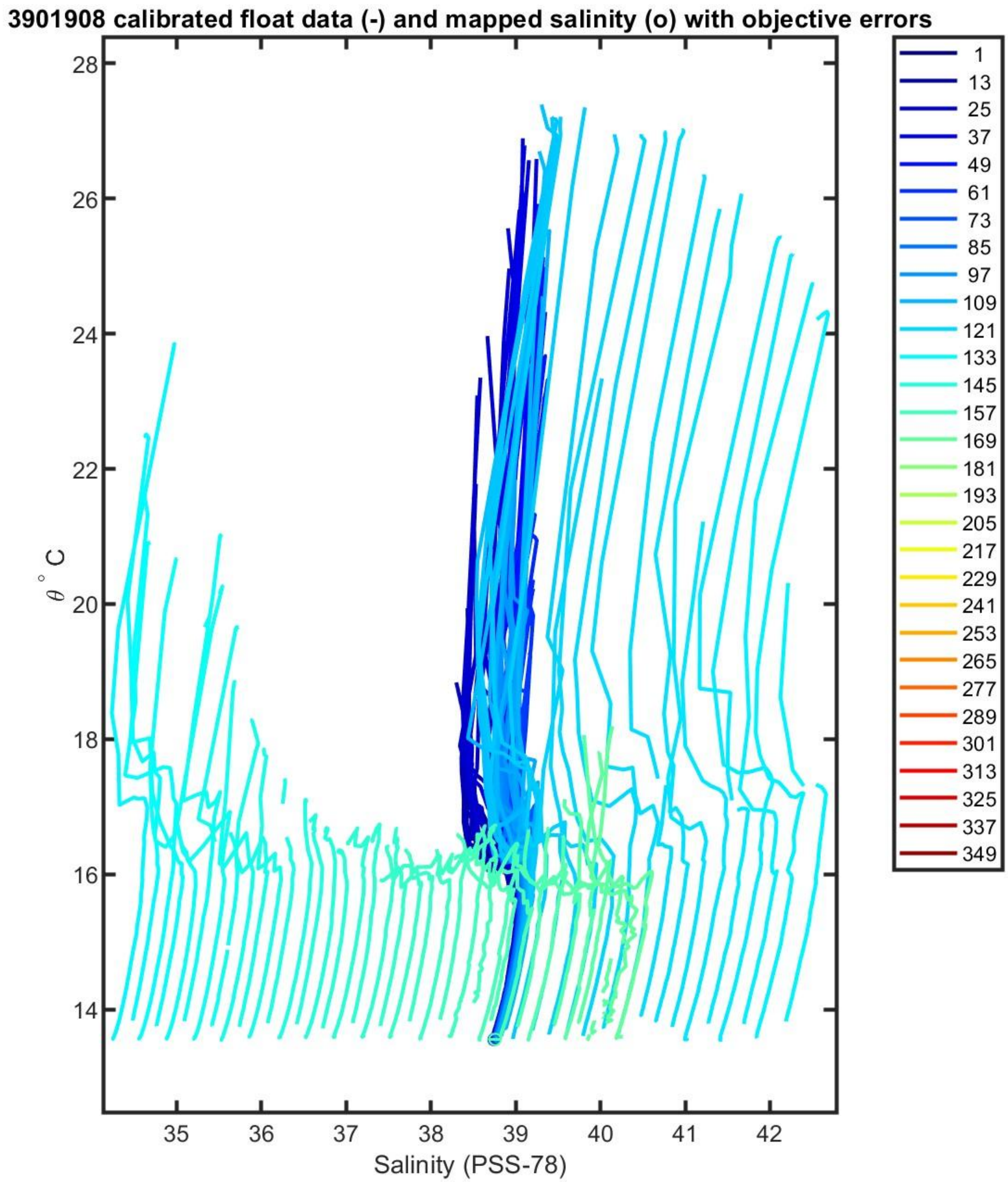

Figure 4: The plot of calibrated float salinity and the objectively estimated reference salinity at the 10 float theta levels that are used in calibration.

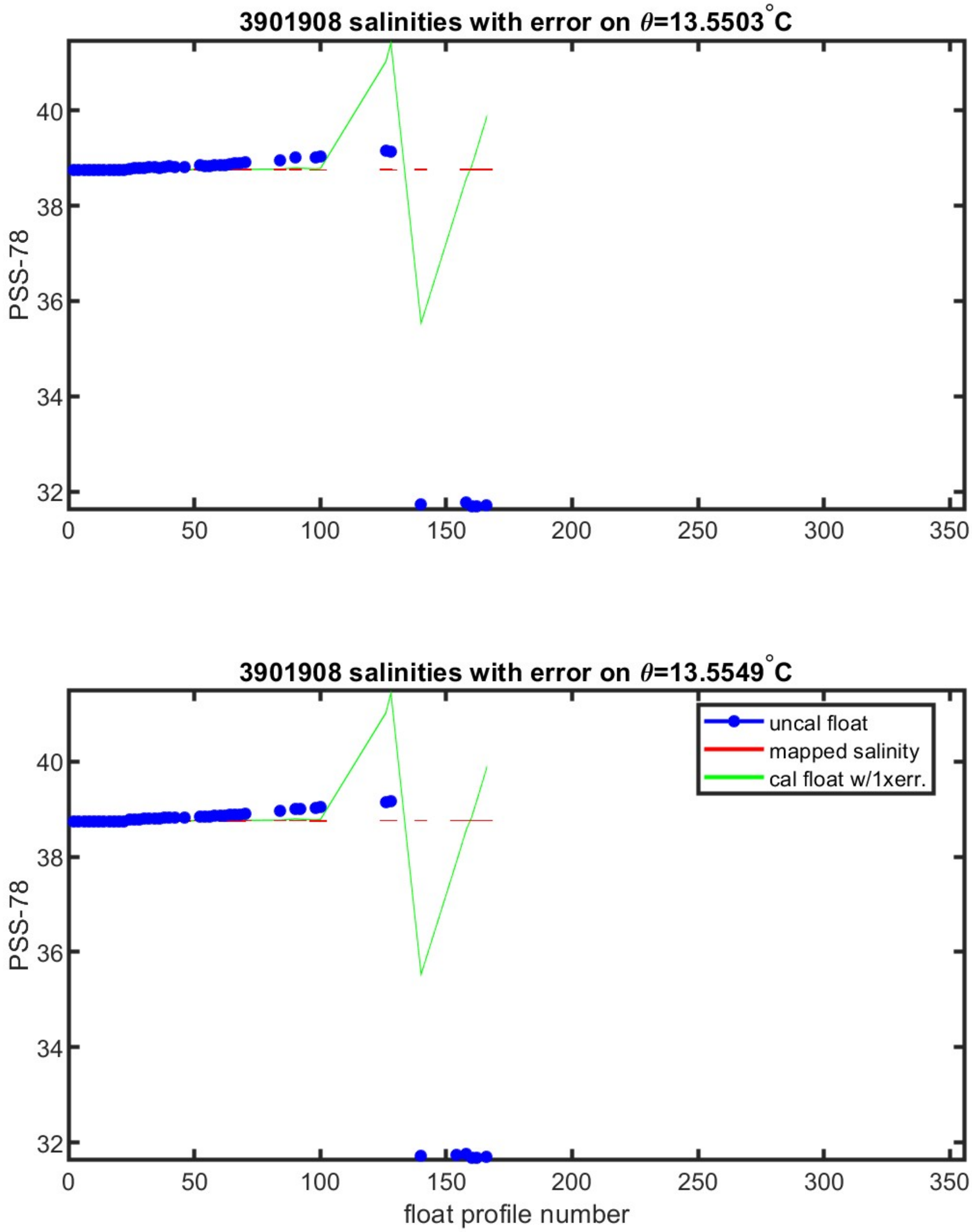

Figure 5: Plots of the evolution of salinity with time along with selected theta levels with minimum salinity variance.

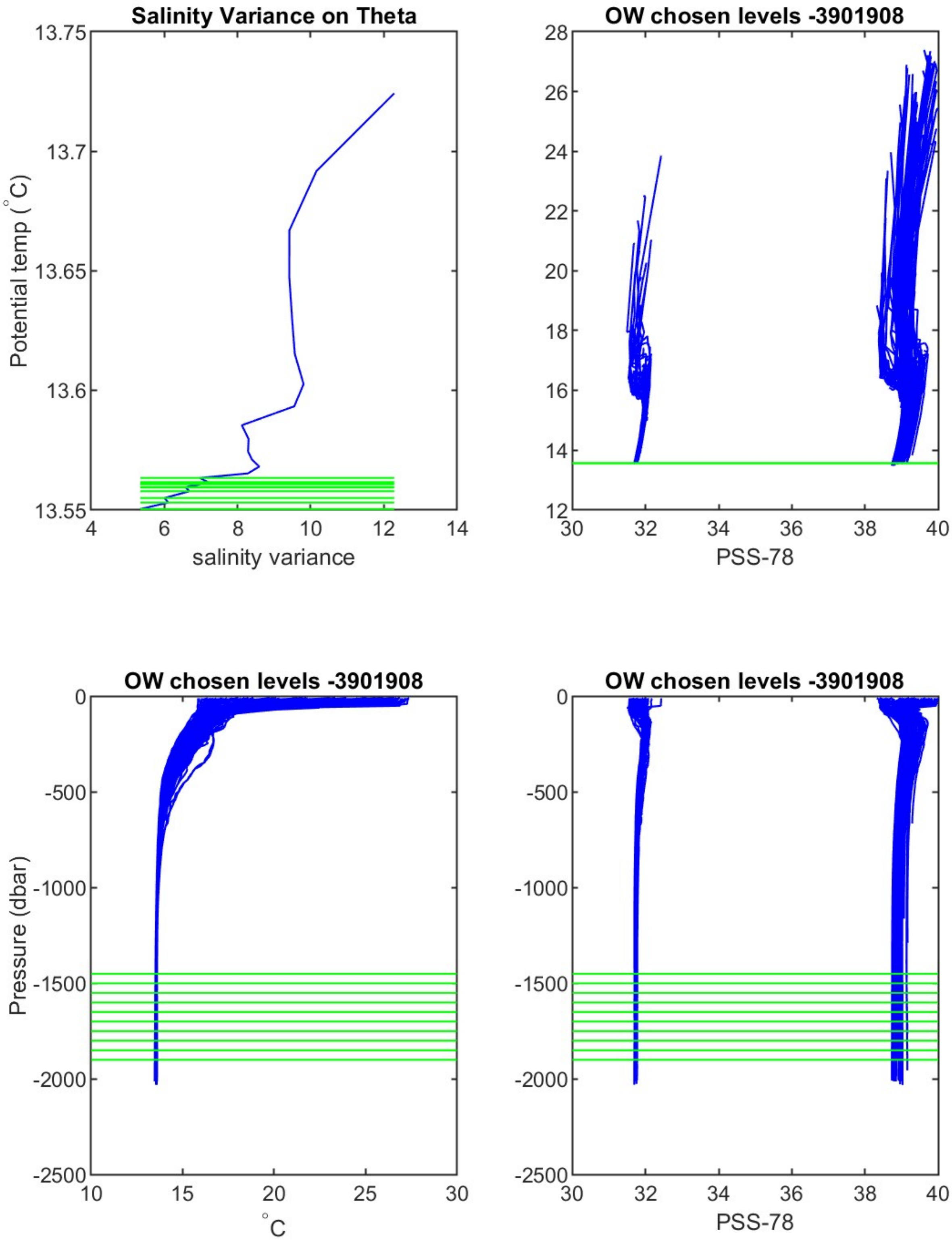

Figure 6: Plots include the theta levels chosen for calibration: Top left: Salinity variance at theta levels. Top right: T/S diagram of all profiles of Argo float. Bottom left: potential temperature plotted against pressure. Bottom right: salinity plotted against pressure.

Summary

Float WMO 3901908 was deployed in the Ionian sub-basin, in the Mediterranean Sea. During its life passed in Cretan and Levantine sub basins. This float was DMQC-ed before: no correction and QC 1 is applied to cycles 1 – 22, QC 4 for cycle 23 – 220. We apply OWC taking in account the deepest profiles. The OWC analysis showed no significant salinity drift until profile 22 followed by a significant salinity drift. Figure 5 shows a significant drift for cycle from 23 on selected θ-levels. The correction proposed by OW is over the Argo requested accuracy (0.01) for these profiles. Additional analyses (the visual inspection of the deepest portion of the θ-S diagram and the comparison of selected float salinity profiles with the nearby historical CTD profiles) are applied in complement of the OWC method, to provide the best quality control analysis. In addition a comparison with another floats is made in order to have an additional qualitative analysis. The last decision is that the salinity data of float WMO 3901908 doesn't need a delayed mode correction. QC 1 is applied to cycles from 1 to 22 and QC 4 to cycles from 23 to 355.

PSAL_ADJUSTED=PSAL from cycle 1 to 355

The quality flags applied are the following:

PSAL_ADJUSTED_QC='1' from cycle 1 to 22

PSAL_ADJUSTED_QC='4' from cycle 23 to 355

The delayed-mode files (Dfiles) have been created accordingly and sent to the Coriolis GDAC.

References

Cabanes, C., Thierry, V., & Lagadec, C. (2016). Improvement of bias detection in Argo float conductivity sensors and its application in the North Atlantic. Deep-Sea Research Part I: Oceanographic Research Papers, 114, 128–136. https://doi.org/10.1016/j.dsr.2016.05.007