

Note of Delayed Mode Quality Control of Argo float WMO 6903200

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This note includes the results of OWC performed for the WMO 6903200 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 6903200 is the Arvor deep 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 (Cabanès 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	2000
MAP_P_DELTA	250

OWC Results

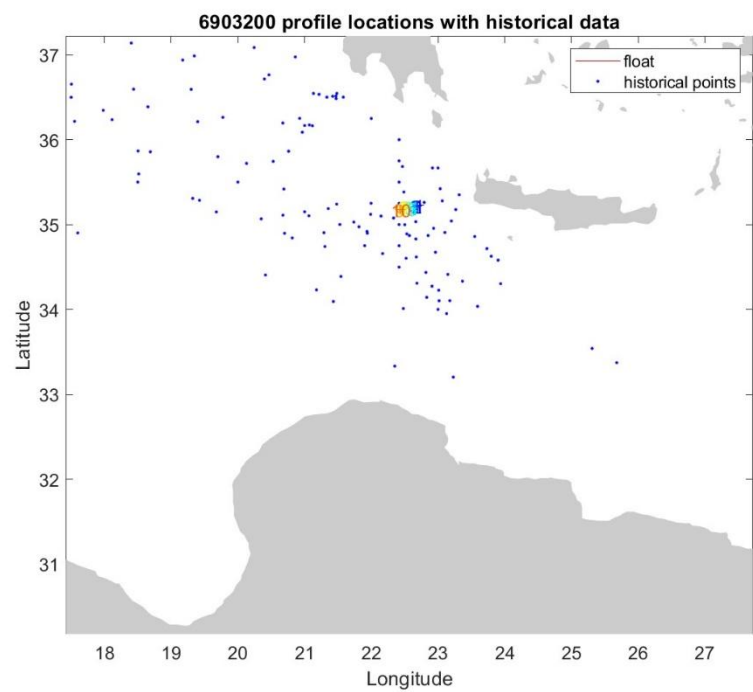


Figure 1: Location of the float profiles (red line with colored numbers) and the reference data selected for mapping (blue dots).

6903200 uncalibrated float data (-) and mapped salinity (o) with objective errors

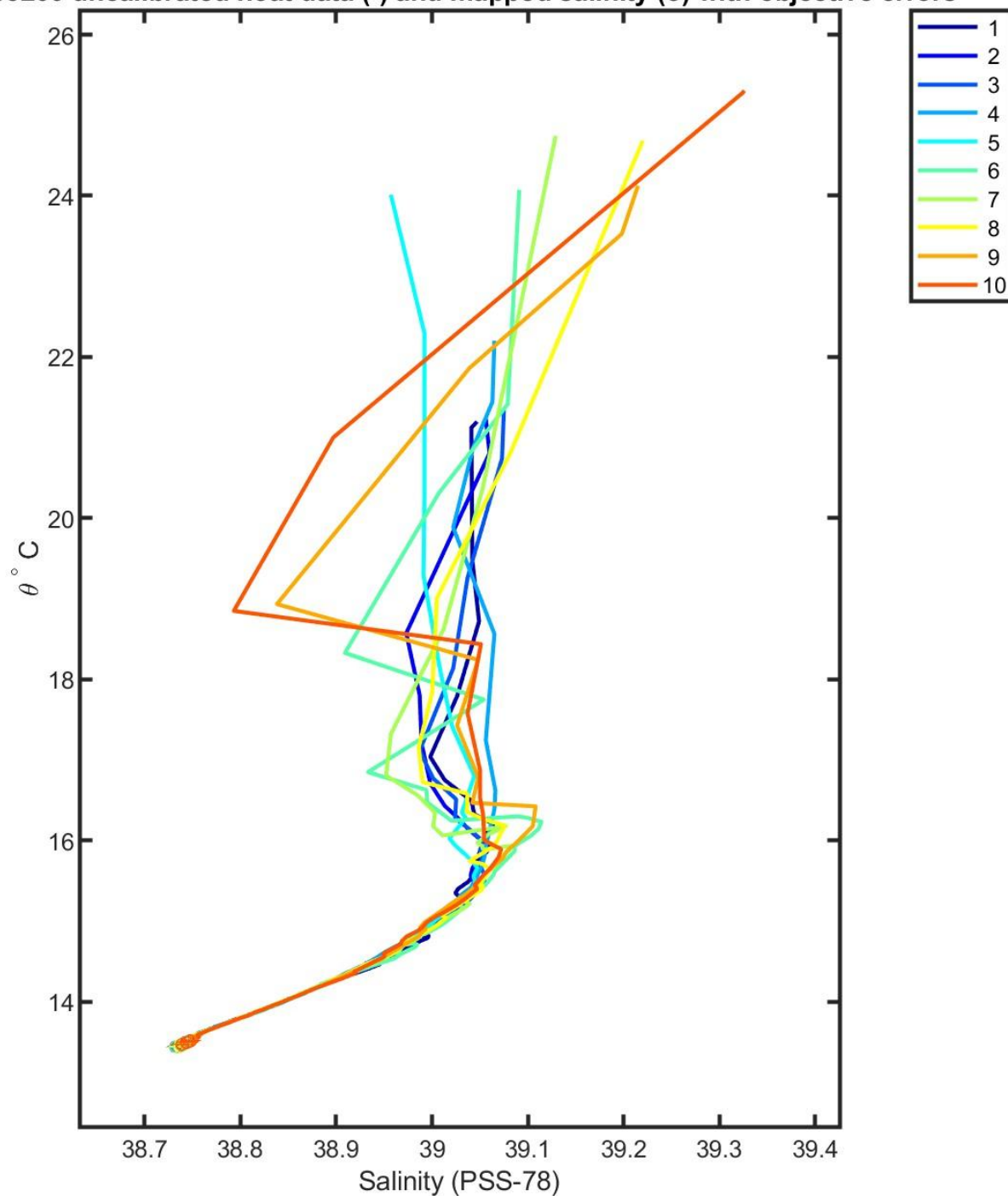


Figure 2: Plot the original float salinity and the objectively estimated reference salinity at the 10 float theta levels that are used in calibration.

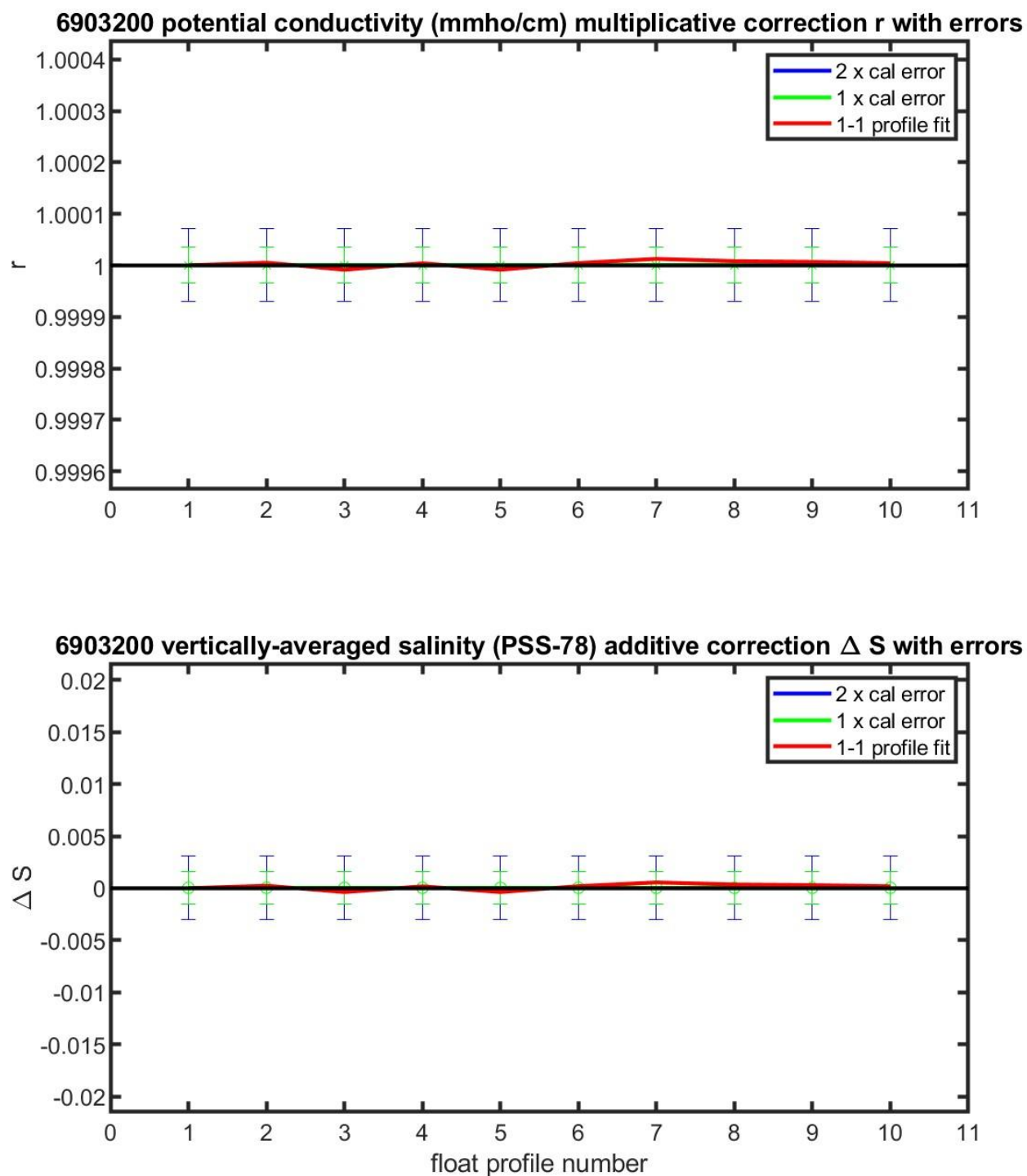


Figure 3: Evolution of the suggested adjustment with time. The top panel plots the potential conductivity multiplicative adjustment. The bottom panel plots the equivalent salinity additive adjustment. The red line denotes one-to-one profile fit that uses the vertically weighted mean of each profile.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

6903200 calibrated float data (-) and mapped salinity (o) with objective errors

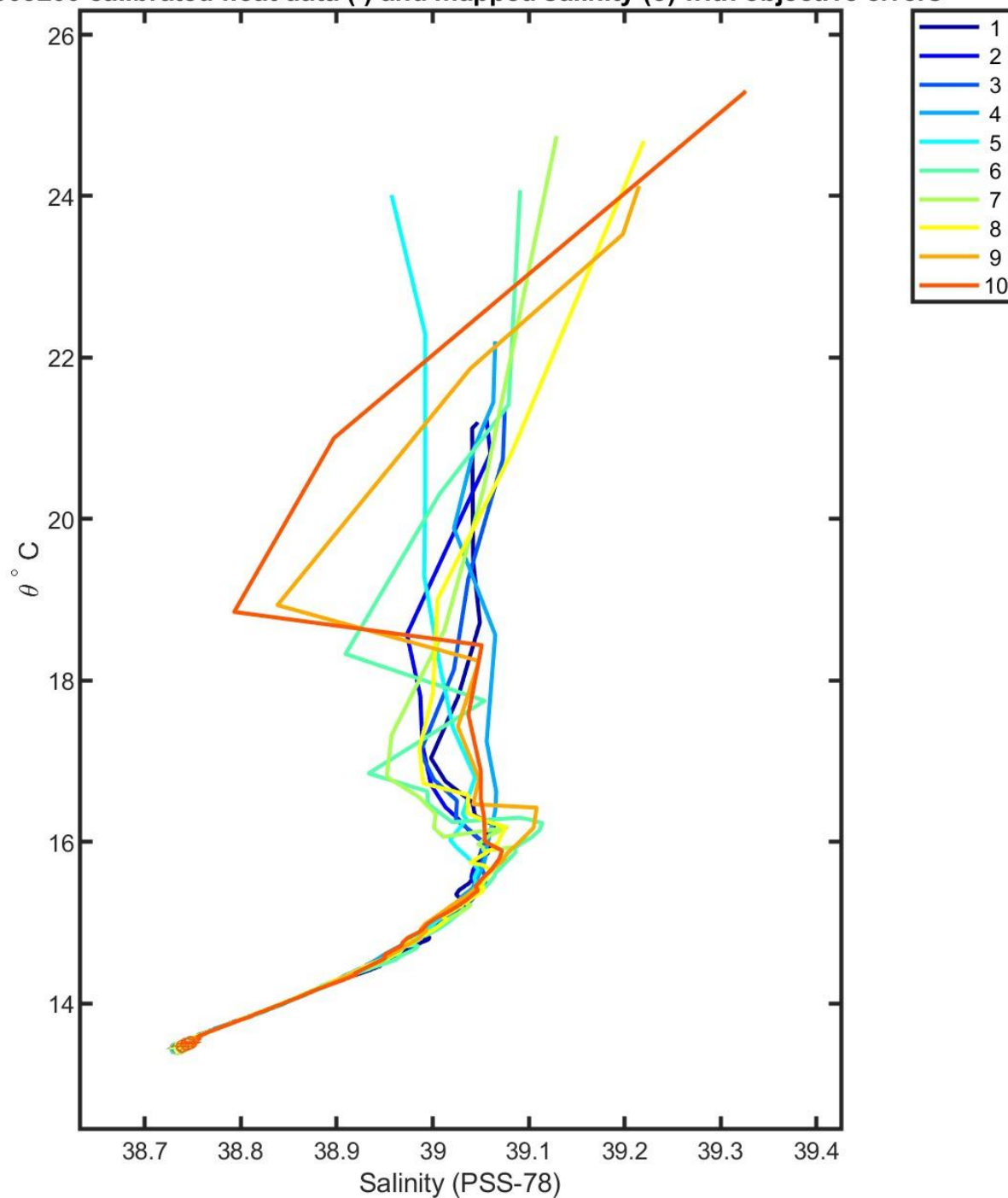


Figure 4: The plot of calibrated float salinity and the objectively estimated reference salinity at the 10 float theta levels that are used in calibration.

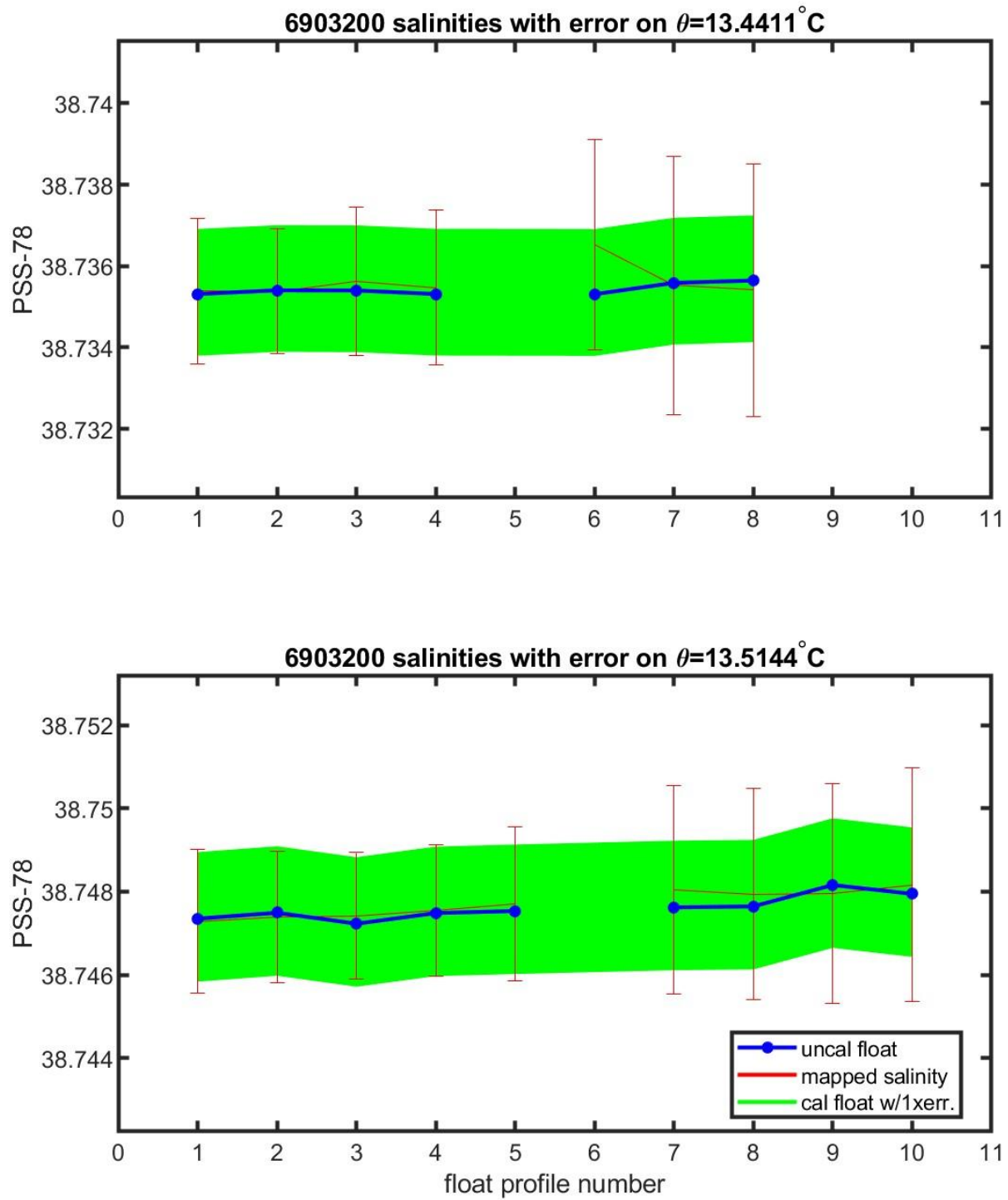
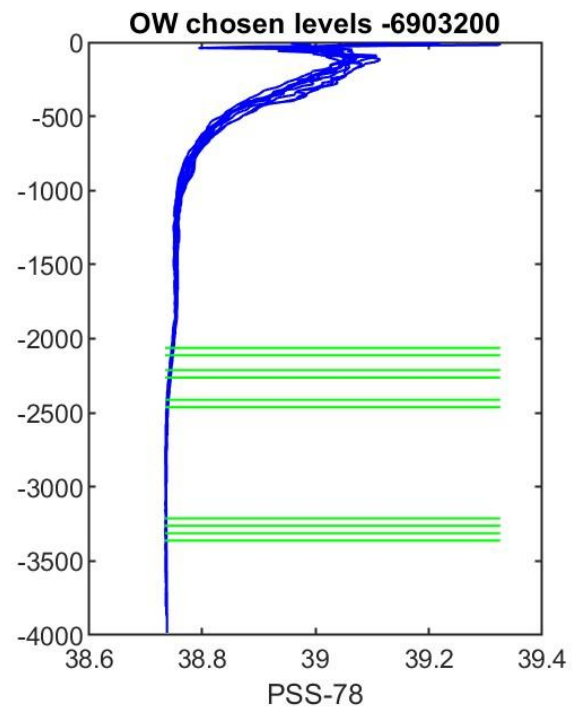
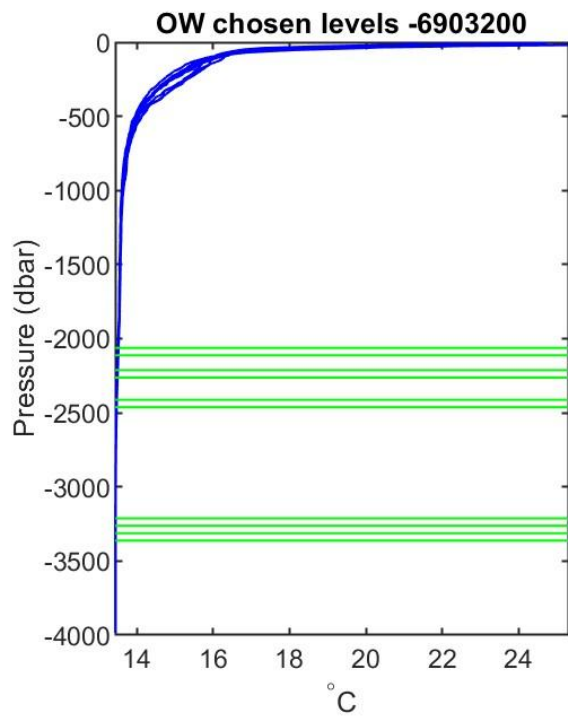
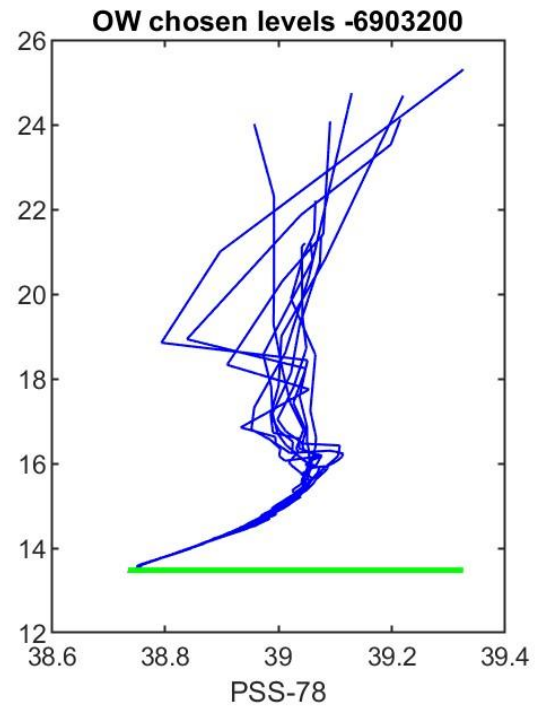
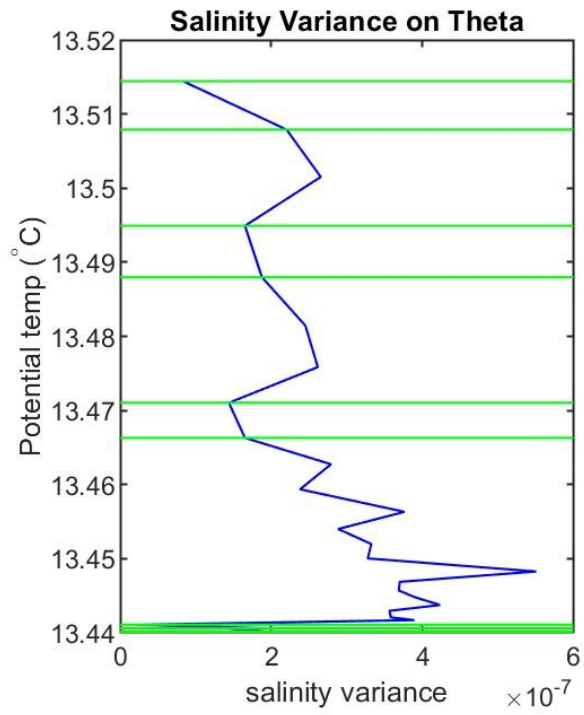


Figure 5: Plots of the evolution of salinity with time along with selected theta levels with minimum salinity variance.



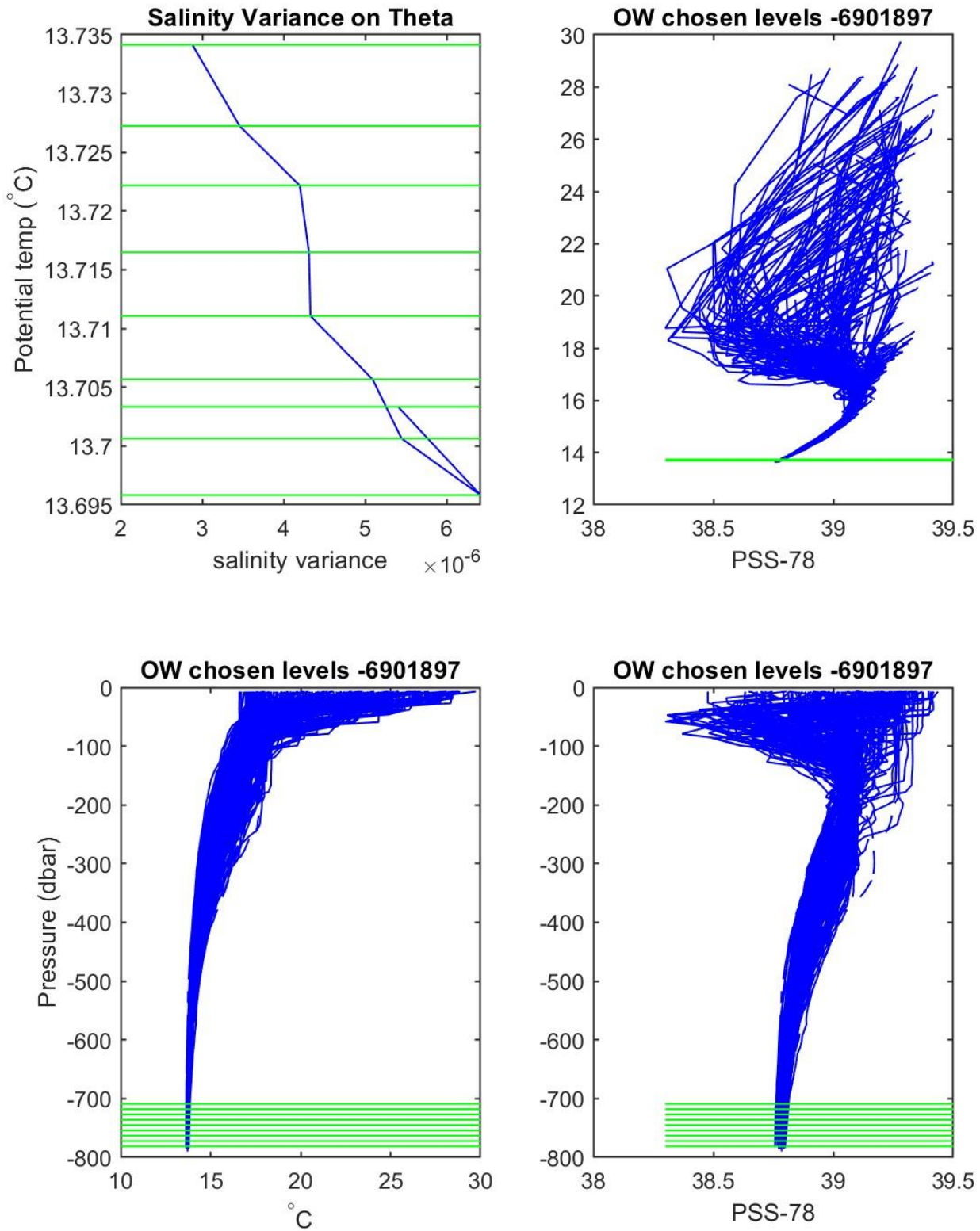


Figure 6: Plots include the theta levels chosen for calibration: Top left: Salinity variance at theta levels. Top right: T/S diagram of all profiles of Argo float. Bottom left: potential temperature plotted against pressure. Bottom right: salinity plotted against pressure.

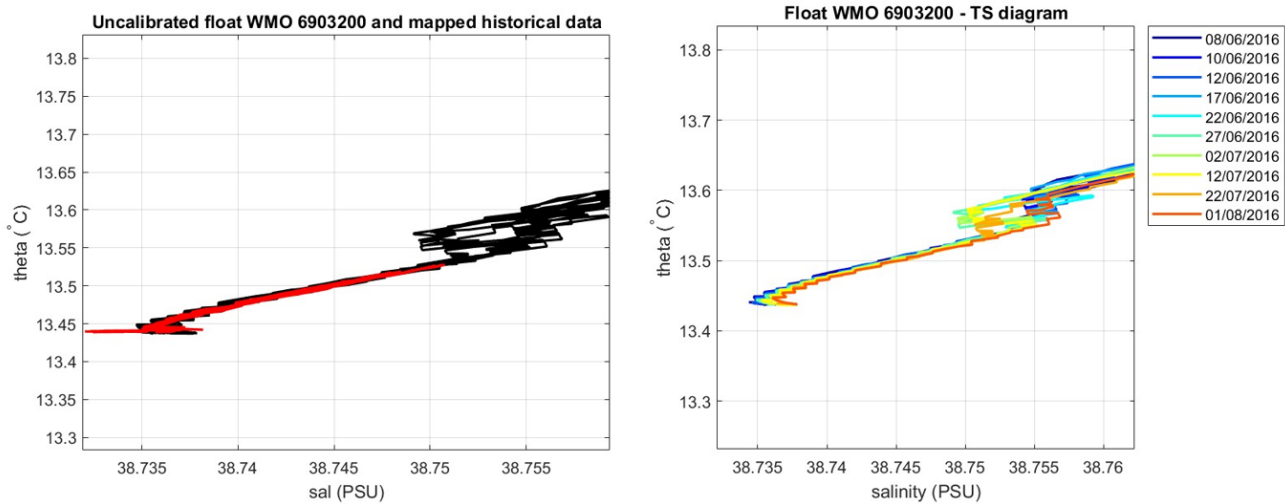


Figure 7: Comparison between float 6903200 and historical CTD on the left and θ -S diagram color-coded per cycle number on the right, in the most uniform part of the θ -S curve.

Summary

Float was deployed in the Cretan sub-basin, in the Mediterranean Sea. It is a deep float. After only 10 cycles the float died. We decided to apply OWC even though there are few cycles. The most favorable water masses, which are useful for comparison with climatology is relatively stable intermediate and deep waters from around 2000 m. We first applied the CPcor correction using $-11.7e-8$ dbar -1 value as suggest by Deep Argo Team. The OWC analysis showed no significant salinity drift. The correction proposed by OWC is below the Argo required accuracy (0.004). To understand if the sensor was well calibrated we compared the profiles with the historical reference profile. The comparison between Argo float and reference data shows no significant salinity offset/drift. The difference between float and historical salinity profiles is within the required accuracy (0.004 psu). We also applied the three CPcor values to identify the more robust one. This comparison evidences the CPcor default value, already applied in real-time, as the best correction.

The salinity data of float WMO 6903200 is accurate and doesn't need a delayed mode correction:

PSAL_ADJUSTED=PSAL from cycle 1 to 10

The quality flags applied are the following:

PSAL_ADJUSTED_QC='1' from cycle 1 to 10

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>