# Delayed mode quality control of MOCCA Argo float 3901915

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**Summary**

Between cycles 1 and 80 float is very variable with the associated error of 0.03, QC=1. From cycles around 100 float started drifting. The OWC was applied, with an error of 0.01.

| WMO number | DM correction |
|---|---|
| 3901915 | Drift detected |

Table 1: Correction applied in delayed mode.

# Contents

# 1 Introduction

Delayed mode analysis was performed for float number 360820i (3901915) where salinity and temperature values were separately compared to nearby historical CTD profiles and nearby Argo profiles as a reference database. The OWC (Cabanes et al., 2016) method was run to estimate a salinity offset and/or a salinity drift. For more information about float 360820i (3901915) click on the following link: http://www.ifremer.fr/argoMonitoring/float/3901915

# 2 Quality Check of Argo Float Data

## 2.1 Time Series of Vertical Distribution of Data

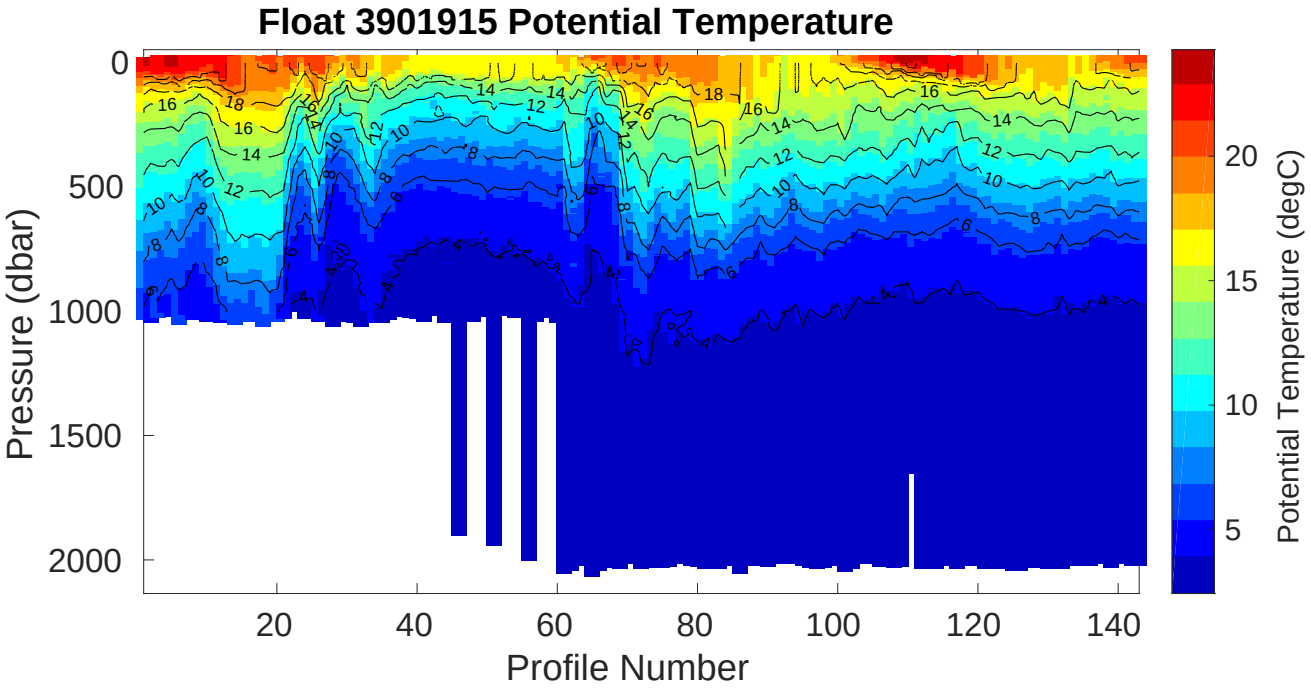


Figure 1: Float 3901915. Time series of the vertical distribution of potential temperature (°C).

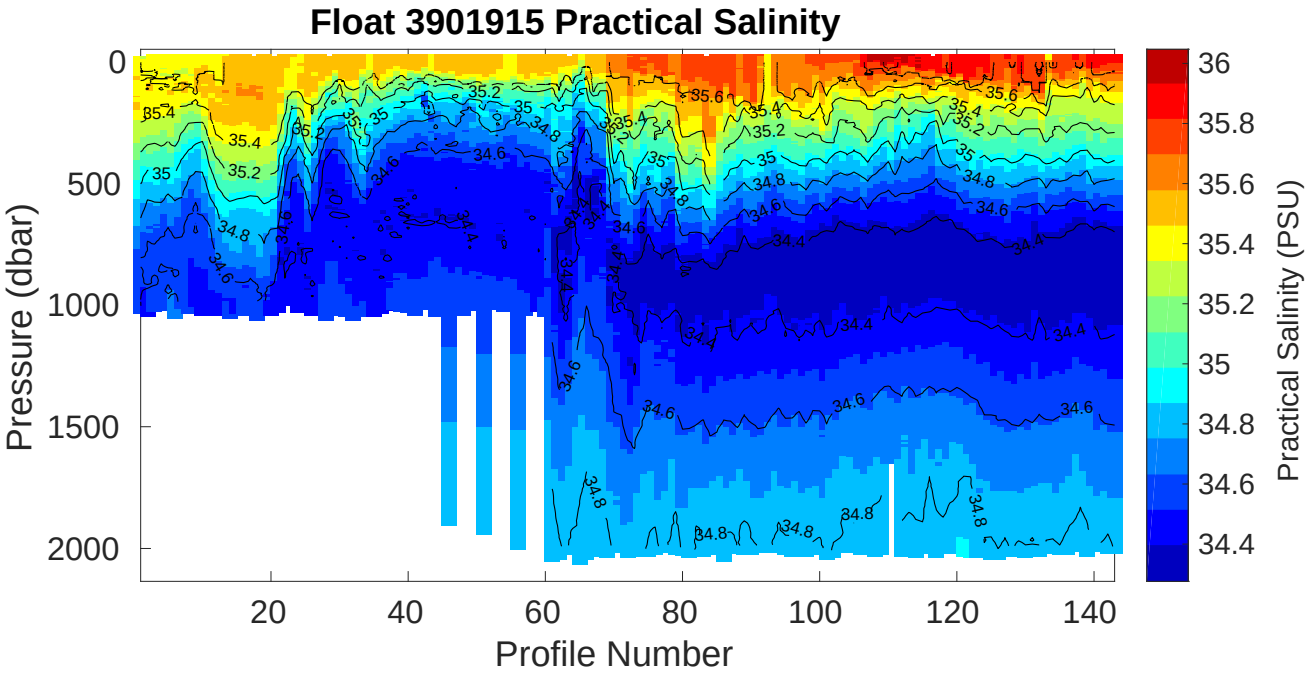


Figure 2: Float 3901915. Time series of the vertical distribution of practical salinity (PSU).

## 2.2 Comparison between Argo Float and Climatology

The comparison between float 3901915 and data from WMO boxes +/- 10°of latitude and longitude shows that the Argo profiles fit within the expected ranges (Figures 3, 4 and 5). This result confirms that float 3901915 represents relatively stable and consistent with the expected physical conditions in this region.

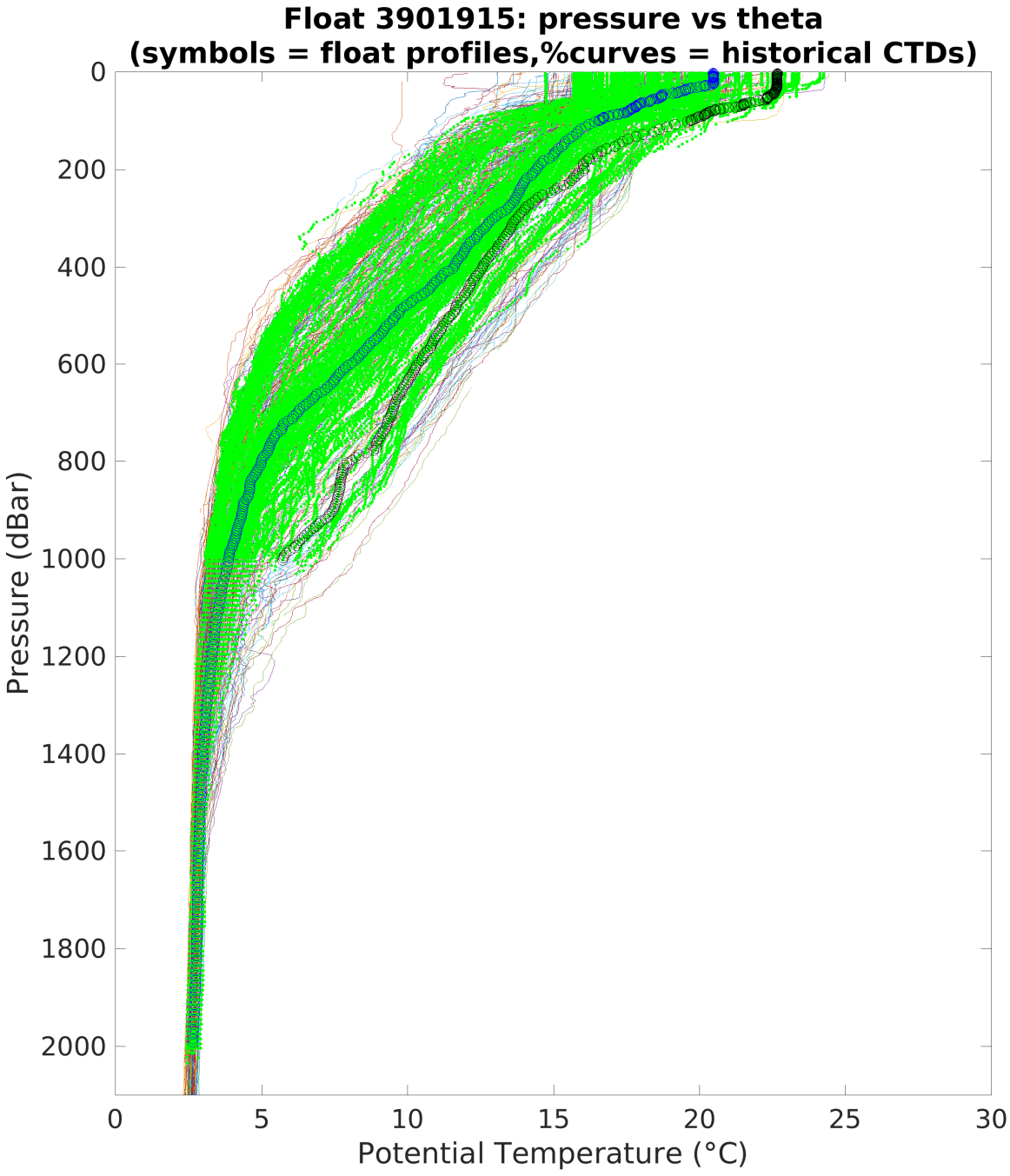


Figure 3: Float 3901915. Float profile of potential temperature (˚C) plotted with climatology from the spatial range of 10 ˚. The black and blue cycles indicates the first and the last Argo profile, respectively. Green symbols represent other Argo profiles.

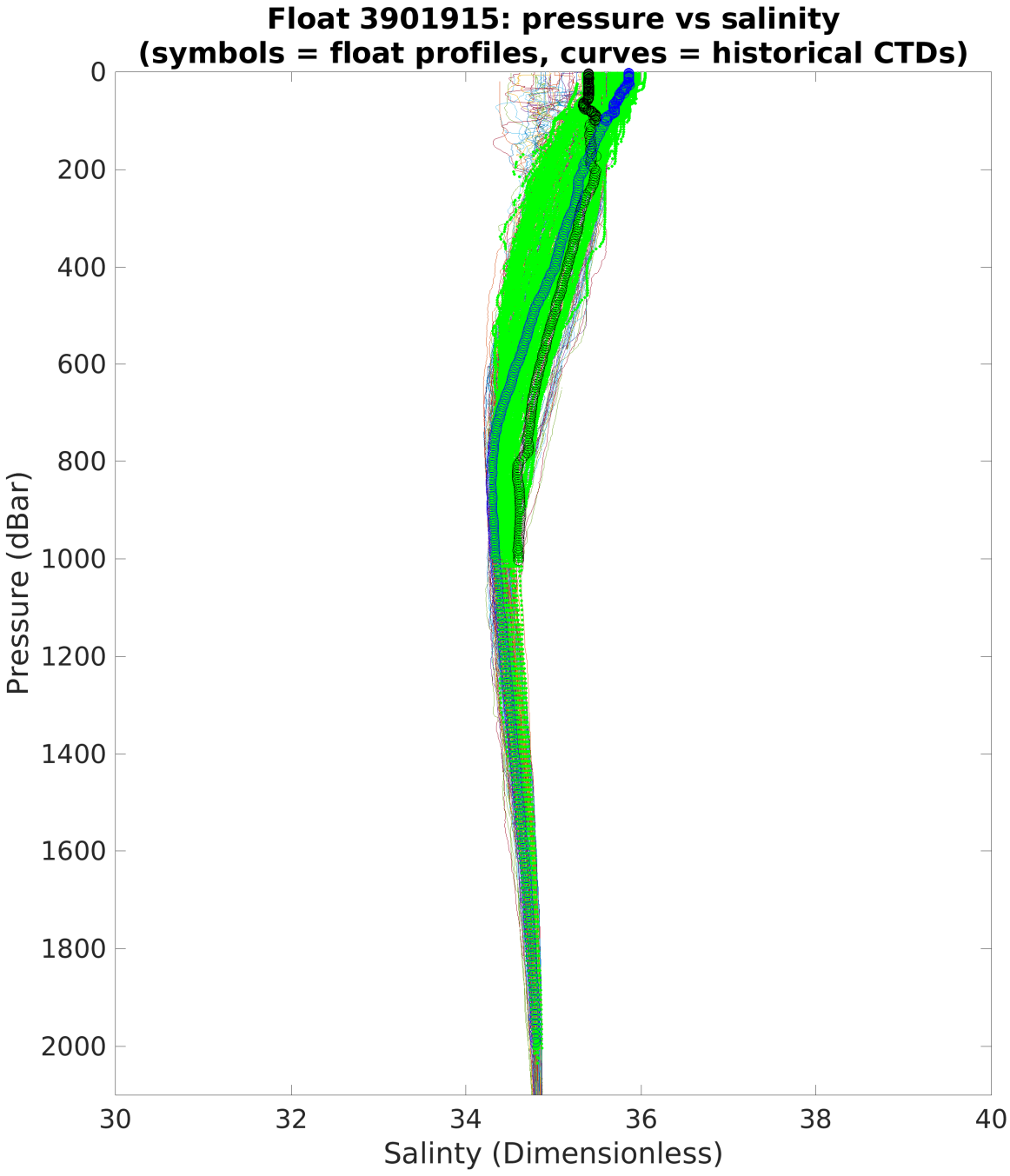


Figure 4: Float 3901915. Float profile of salinity (dimensionless) plotted with climatology from the spatial range of 10 ˚. The black and blue cycles indicates the first and the last Argo profile, respectively. Green symbols represent other Argo profiles.

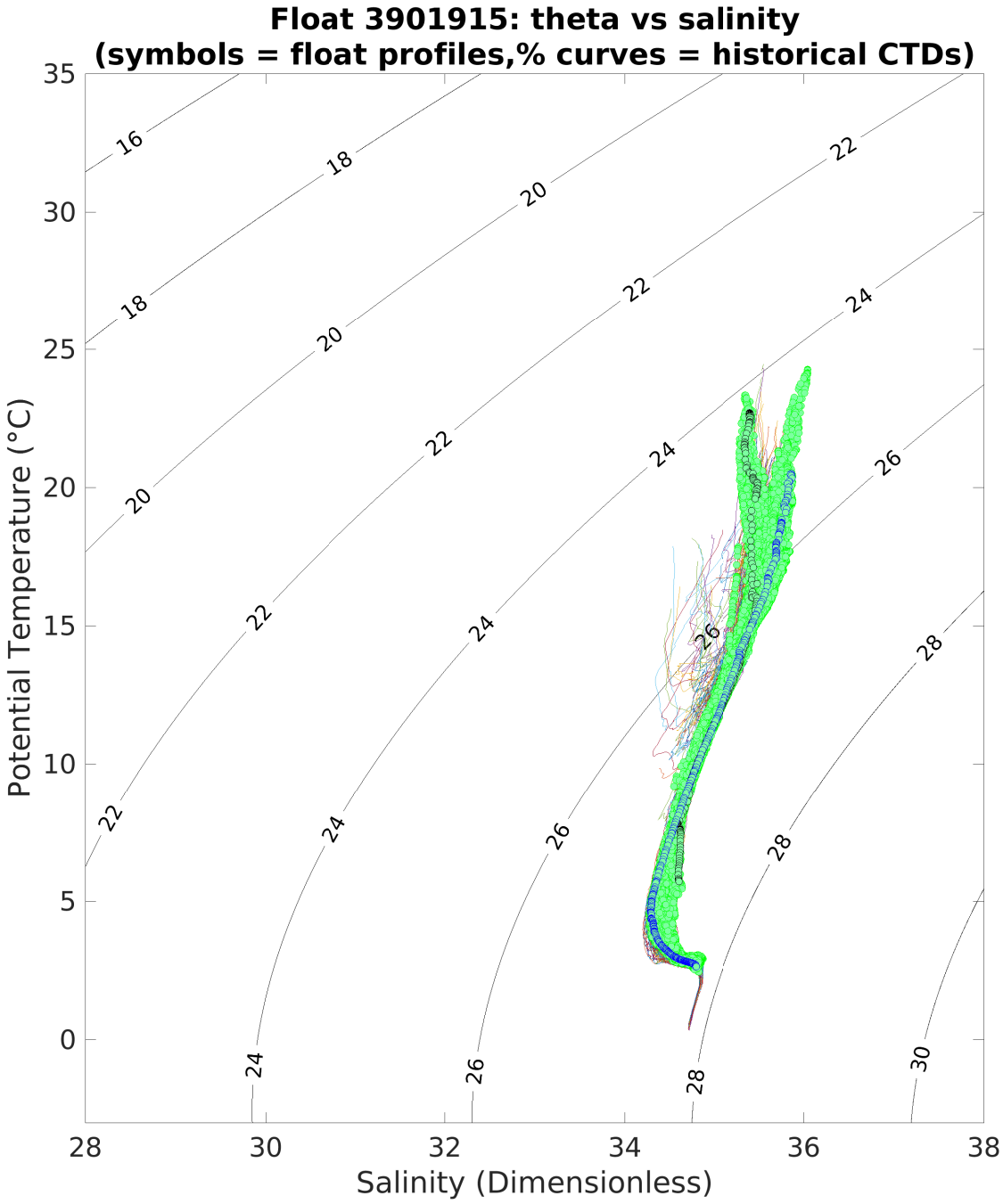


Figure 5: Float 3901915. Theta/S plotted with climatology from the spatial range of 10 °. The black and blue cycles indicates the first and the last Argo profile, respectively. Green symbols represent other Argo profiles.

## 2.3 Satellite Altimeter comparison

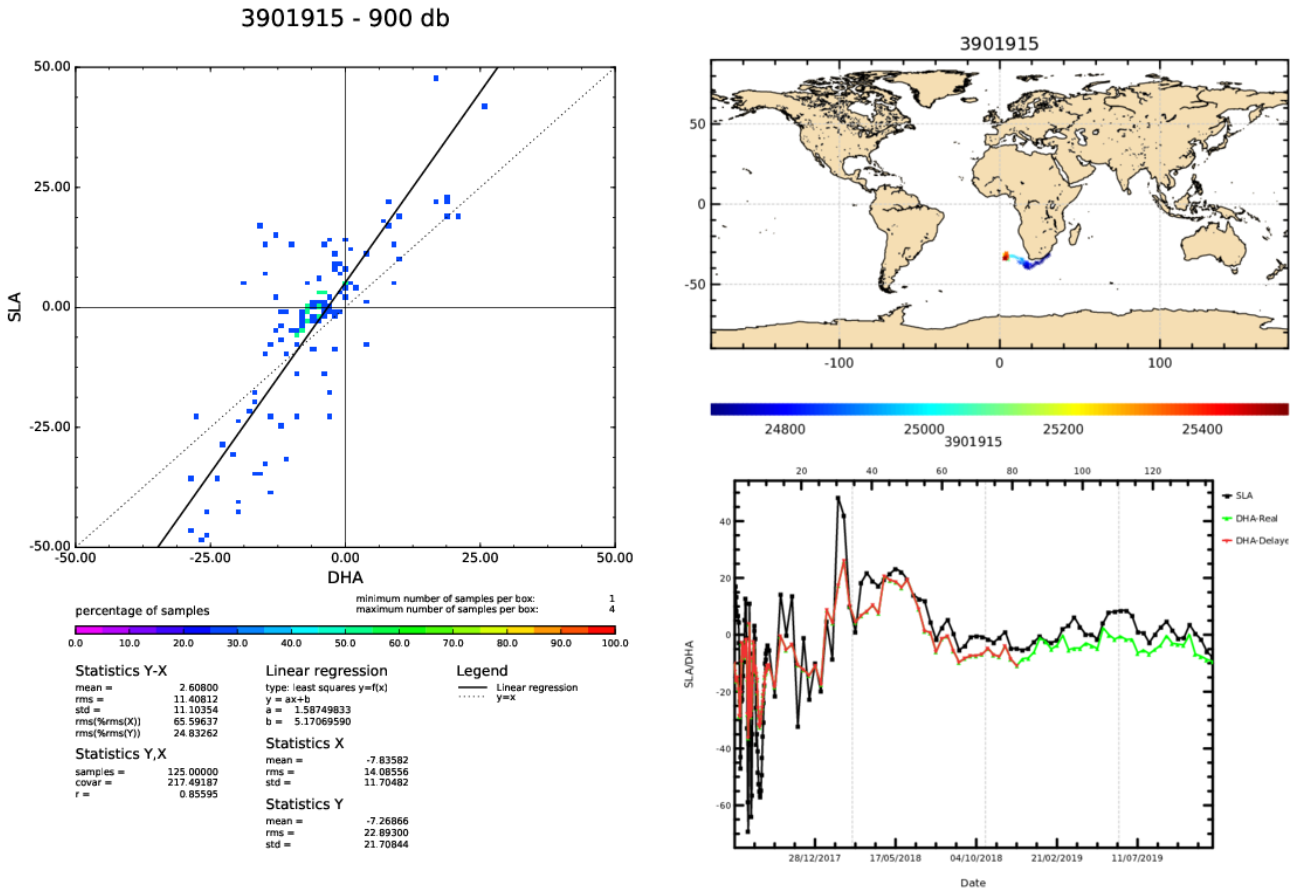


Figure 6: Float 3901915. The comparison betweeen the Sea Surface Height(SSH) from the satellite altimetry and Dynamic Height Anomaly(DHA)extracted from the Argo float temperature and salinity data

# 3 Correction of Salinity Data

## 3.1 Comparison between Argo floats and CTD Climatlogy

### 3.1.1 Configuration

```
% ================================
%
```

```
%    Climatology Data Input Paths
%

HISTORICAL_DIRECTORY=/users/argo/climatology
HISTORICAL_CTD_PREFIX=/historical_ctd/CTD_for_DMQC_2019V01/ctd_
HISTORICAL_BOTTLE_PREFIX=/historical_bot/bot_
HISTORICAL_ARGO_PREFIX=/argo_profiles/ARGO_for_DMQC_2019V03/argo_

% ================================
%
%    Float Input Path
%

FLOAT_SOURCE_DIRECTORY=/users/argo/ow/matlabow-2.0.1/data/float_source/
FLOAT_SOURCE_POSTFIX=.mat

% ================================
%
%    Mapping Output Path
%

FLOAT_MAPPED_DIRECTORY=/users/argo/ow/matlabow-2.0.1/data/float_mapped/ctd/
FLOAT_MAPPED_PREFIX=map_
FLOAT_MAPPED_POSTFIX=.mat

% ================================
%
%    Calibration Output Path
%

FLOAT_CALIB_DIRECTORY=/users/argo/ow/matlabow-2.0.1/data/float_calib/ctd/
FLOAT_CALIB_PREFIX=cal_
FLOAT_CALSERIES_PREFIX=calseries_
FLOAT_CALIB_POSTFIX=.mat

% ================================
%
%    Diagnostic Plots Output Path
%

FLOAT_PLOTS_DIRECTORY=/users/argo/ow/matlabow-2.0.1/data/float_plots/ctd/

% ================================
%
%    Constants File Path
%
```

```
CONFIG_DIRECTORY=/users/argo/ow/matlabow-2.0.1/data/constants/
CONFIG_COASTLINES=coastdat.mat
CONFIG_WMO_BOXES=wmo_boxes_ctd.mat
CONFIG_SAF=TypicalProfileAroundSAF.mat

% ================================
%
%    Objective Mapping Parameters
%

% max number of historical casts used in objective mapping
CONFIG_MAX_CASTS=310

% 1=use PV constraint, 0=don't use PV constraint, in objective mapping
MAP_USE_PV=1

% 1=use SAF separation criteria, 0=don't use SAF separation criteria, in objective mapping
MAP_USE_SAF=0

% spatial decorrelation scales, in degrees
MAPSCALE_LONGITUDE_LARGE=3
MAPSCALE_LONGITUDE_SMALL=1.5
MAPSCALE_LATITUDE_LARGE=2
MAPSCALE_LATITUDE_SMALL=1

% cross-isobath scales, dimensionless, see BS(2005)
MAPSCALE_PHI_LARGE=0.1
MAPSCALE_PHI_SMALL=0.02

% temporal decorrelation scale, in years
MAPSCALE_AGE=5
MAPSCALE_AGE_LARGE=10

% exclude the top xxx dbar of the water column
MAP_P_EXCLUDE=100

% only use historical data that are within +/- yyy dbar from float data
MAP_P_DELTA=50
```

### 3.1.2 Results

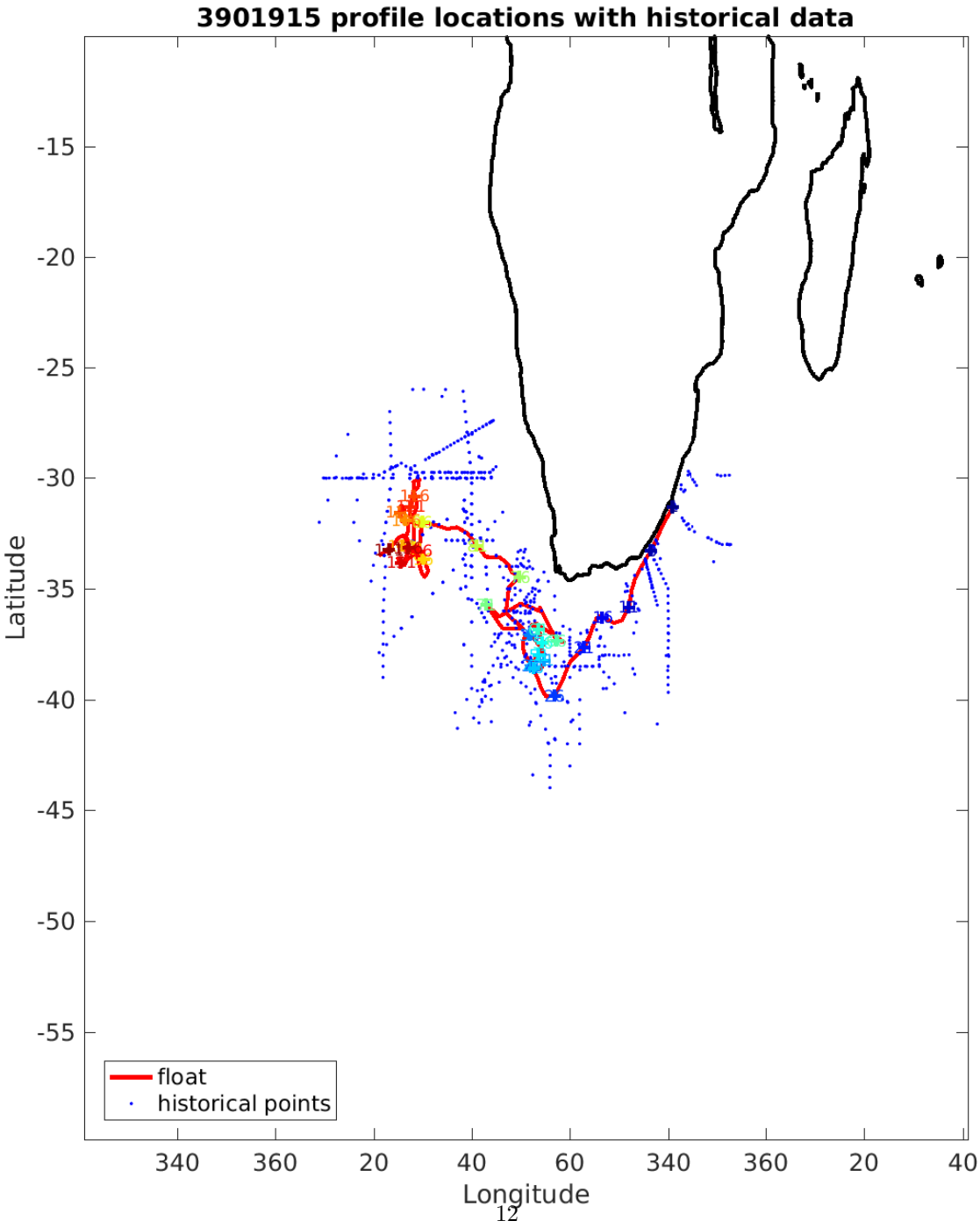


Figure 7: Float 3901915. Trajectory of the float with historical CTD data. The black contours indicate the bathymetry at 0, 200, 1000 and 2000 m.

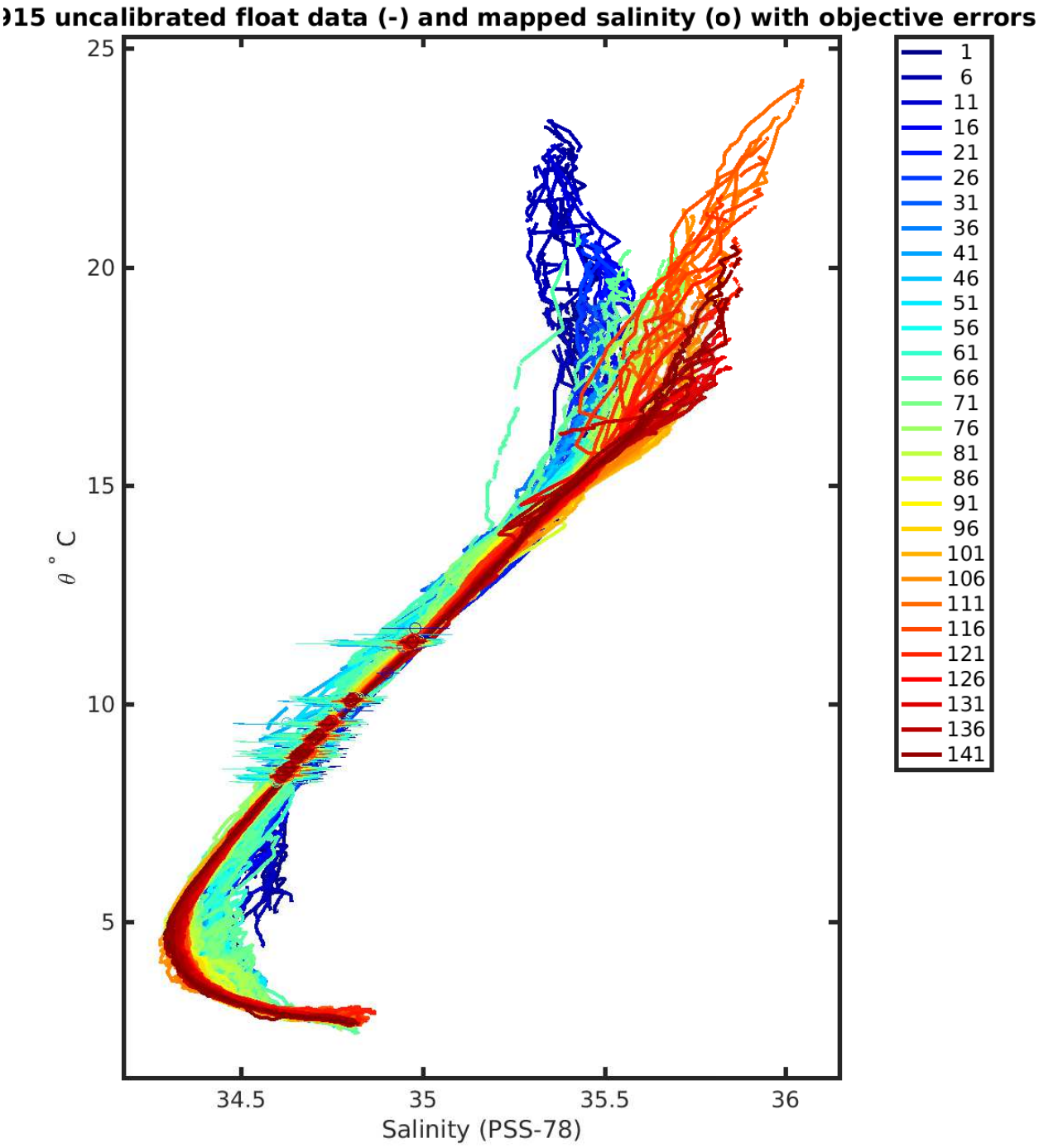




Figure 8: Float 3901915. Uncalibrated float data and mapped salinity.

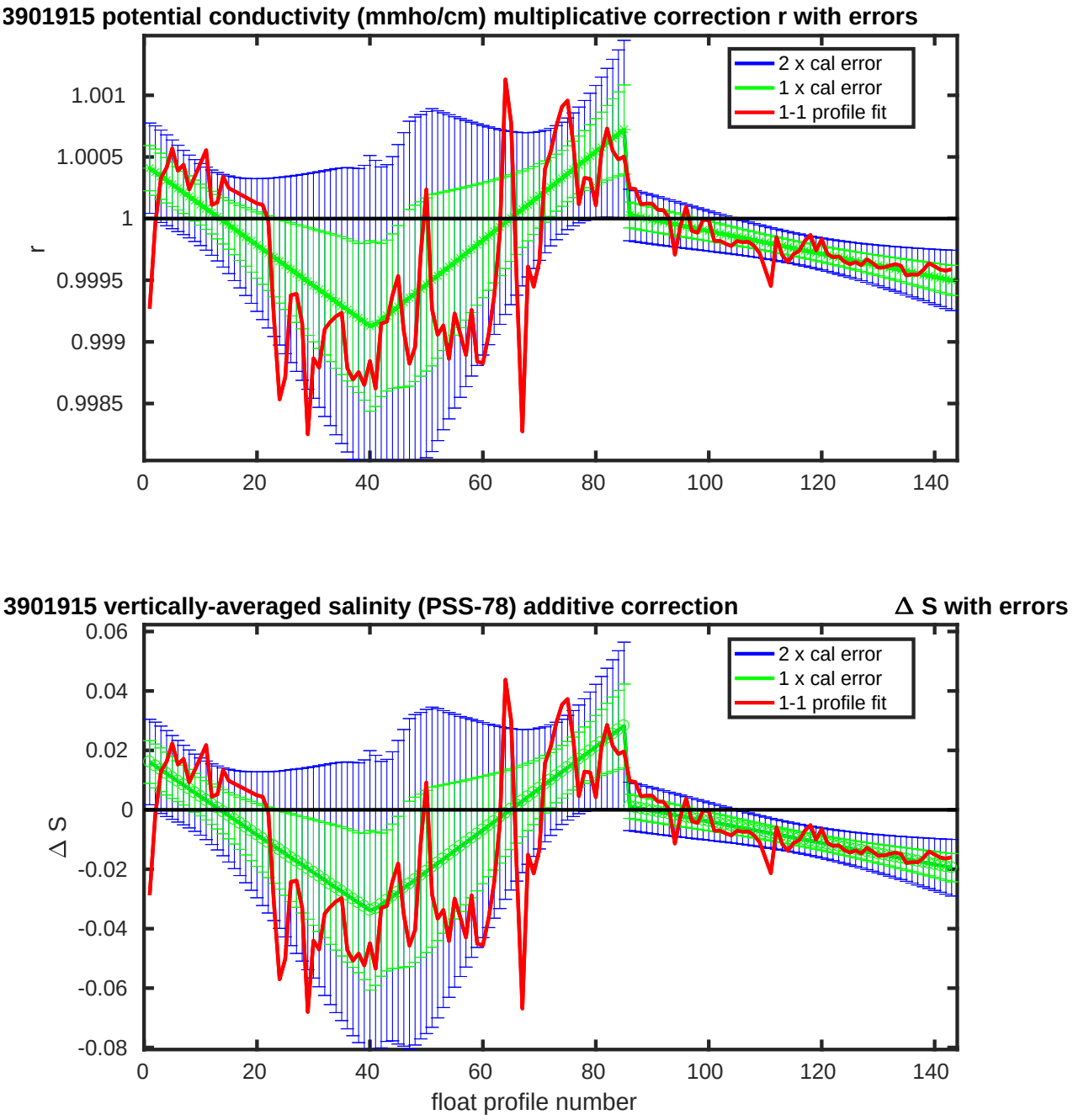


Figure 9: Float 3901915. Potential conductivity (top) and vertically averaged salinity (bottom) with errors.

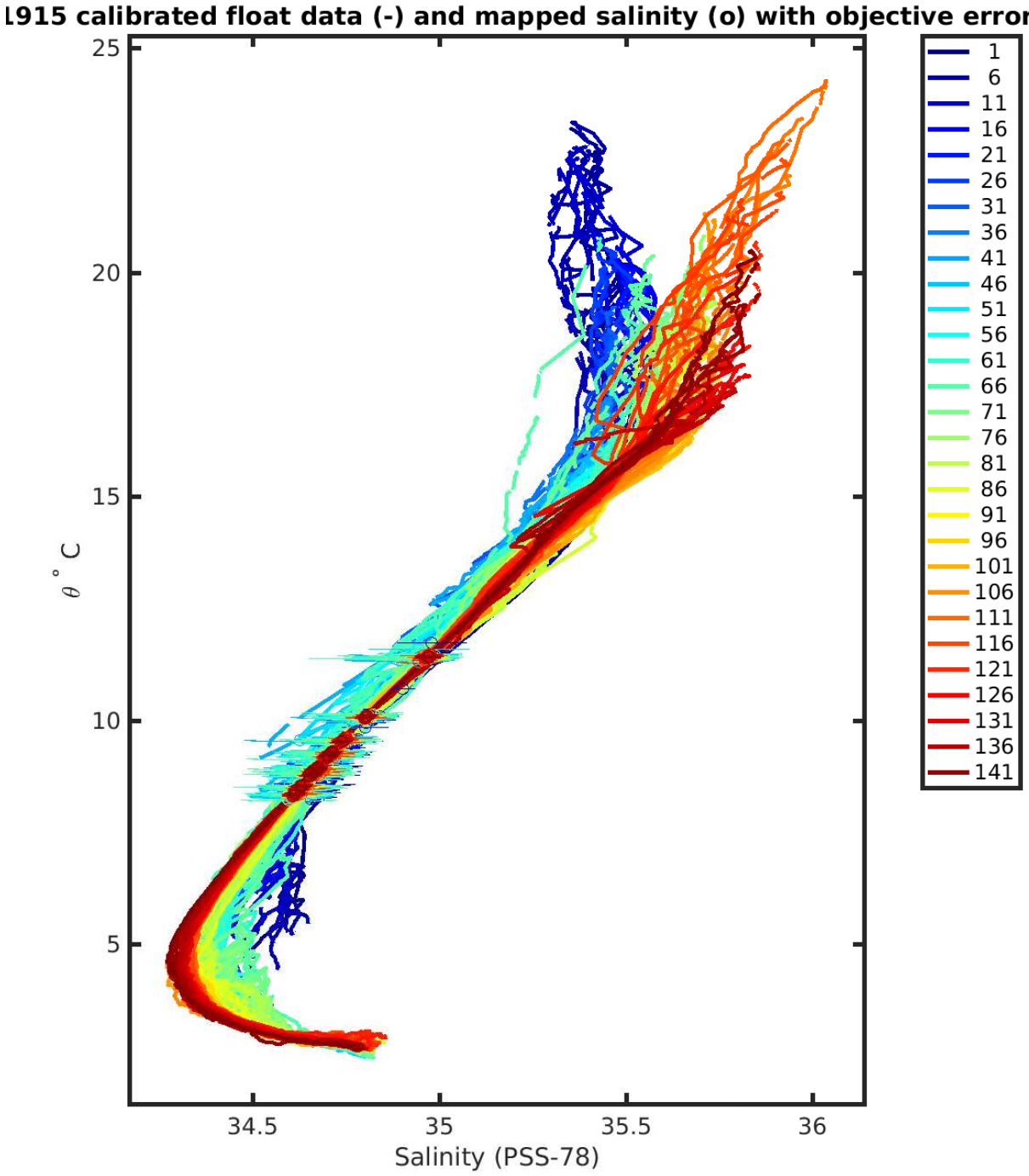




Figure 10: Float 3901915. Calibrated float data and mapped salinity.

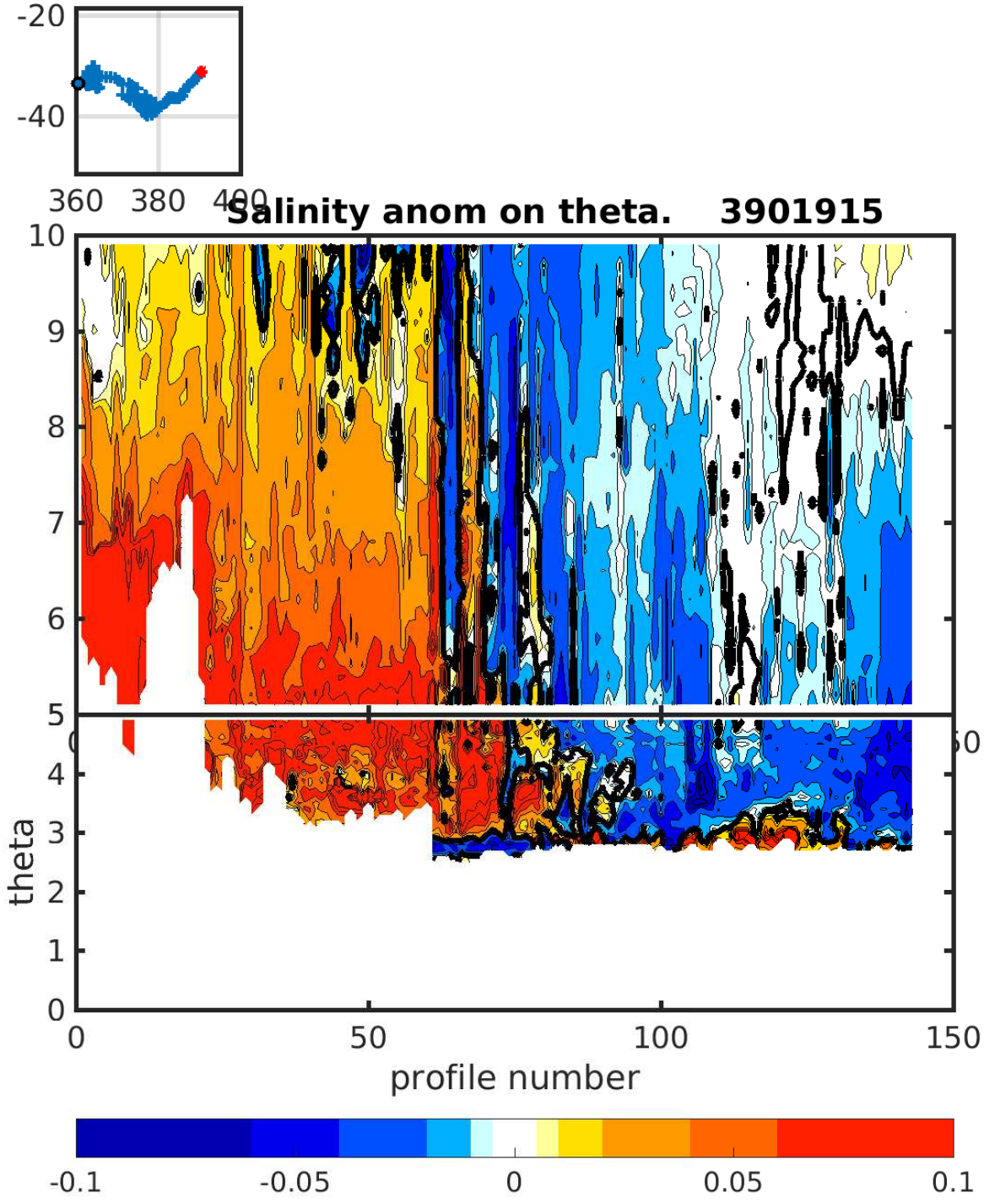




Figure 11: Float 3901915. Salinity anomaly on $\theta$ levels.

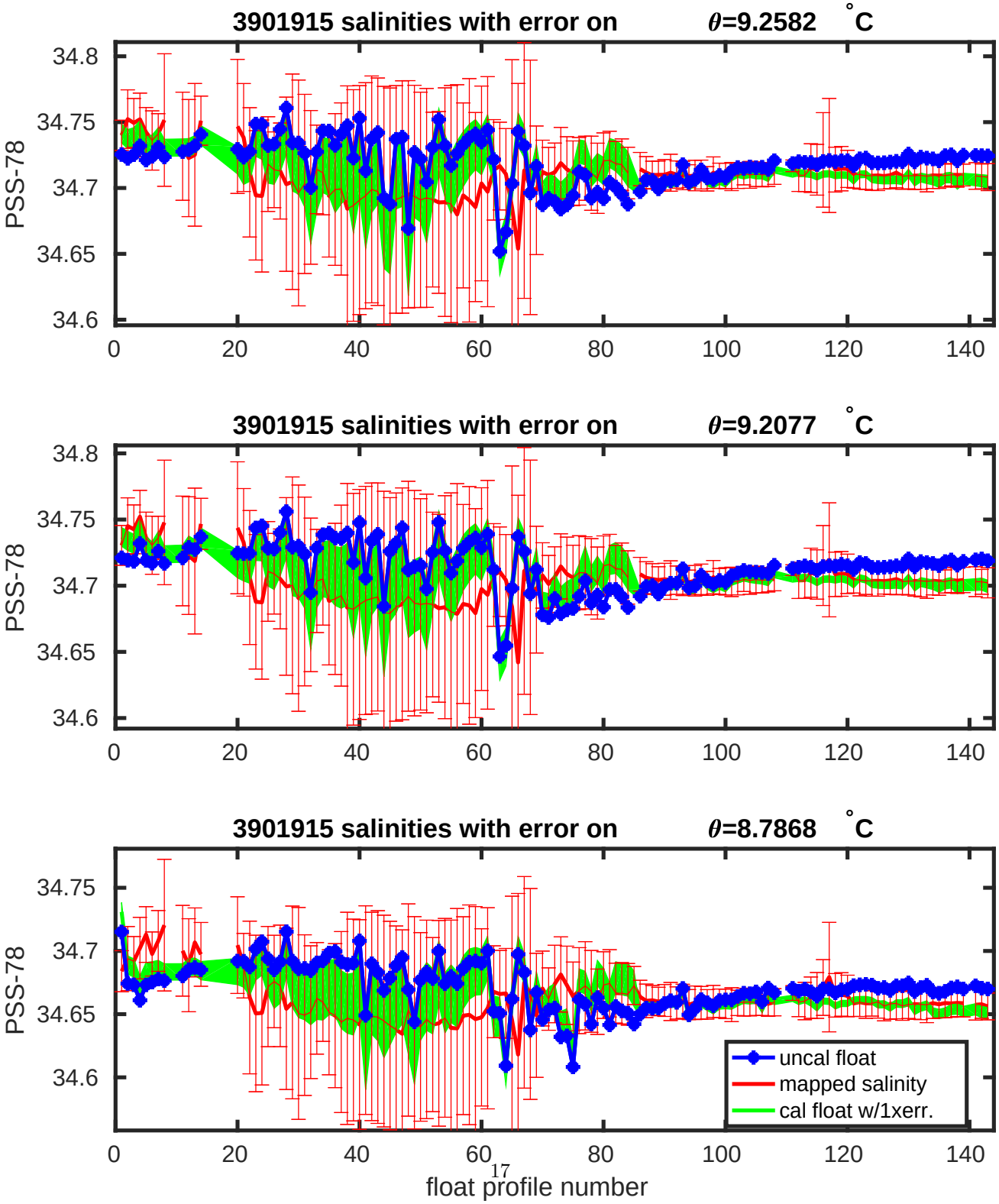




Figure 12: Float 3901915. Salinities with errors on $\theta$ levels.

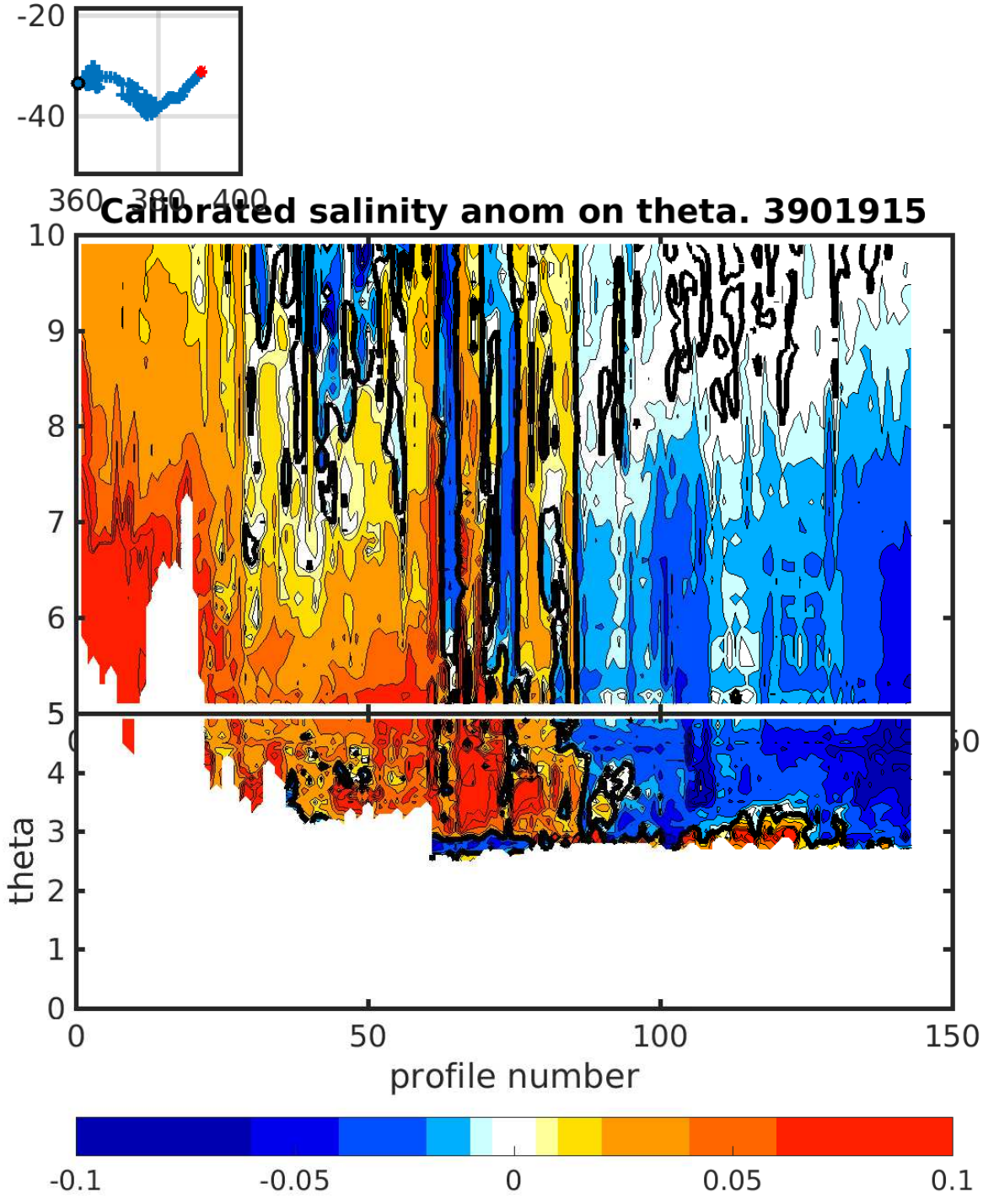




Figure 13: Float 3901915. Calibrated salinity anomaly on $\theta$ levels.

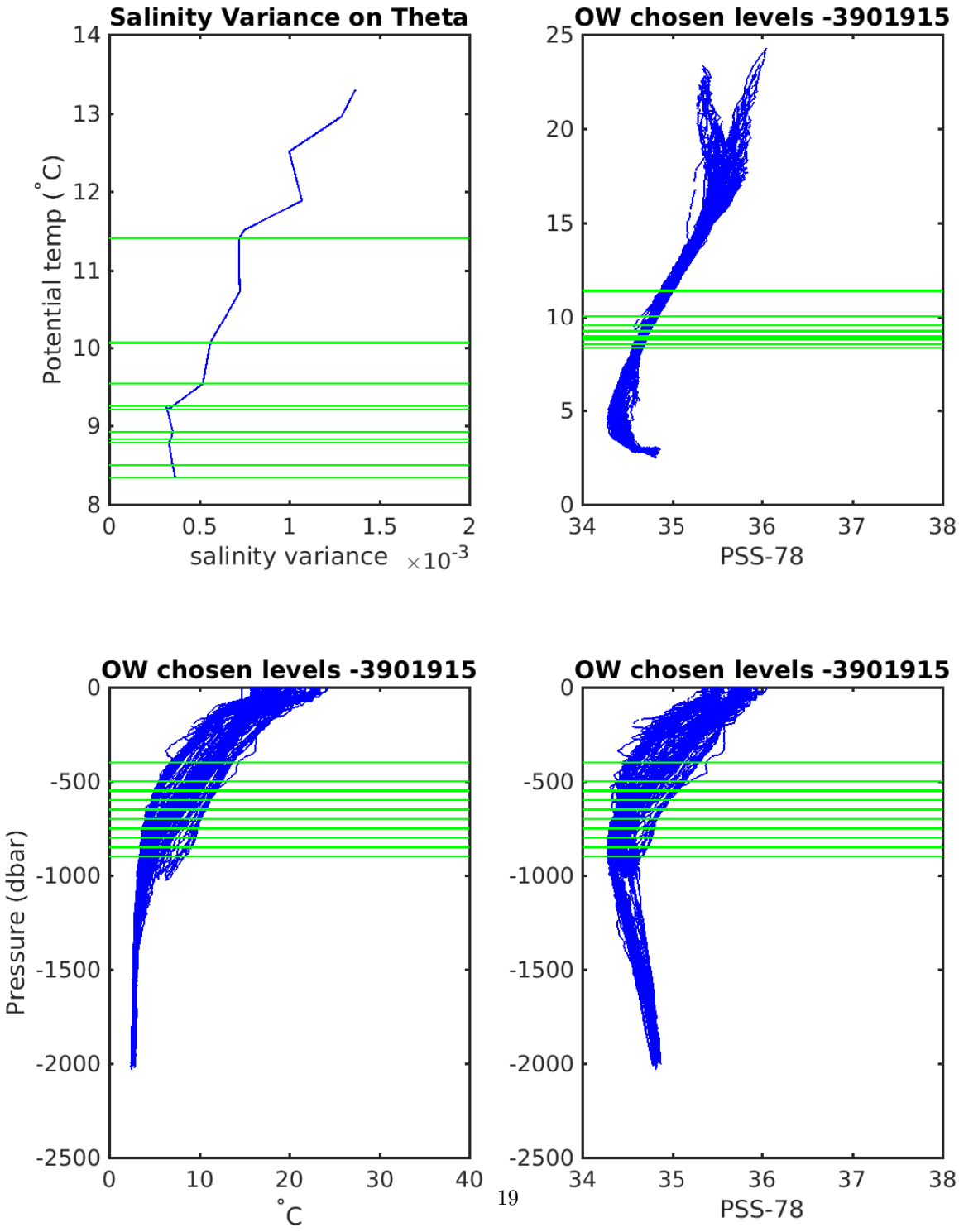




Figure 14: Float 3901915. Salinity, salinity variance on theta and OW chosen levels.

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### 3.2.2 Results

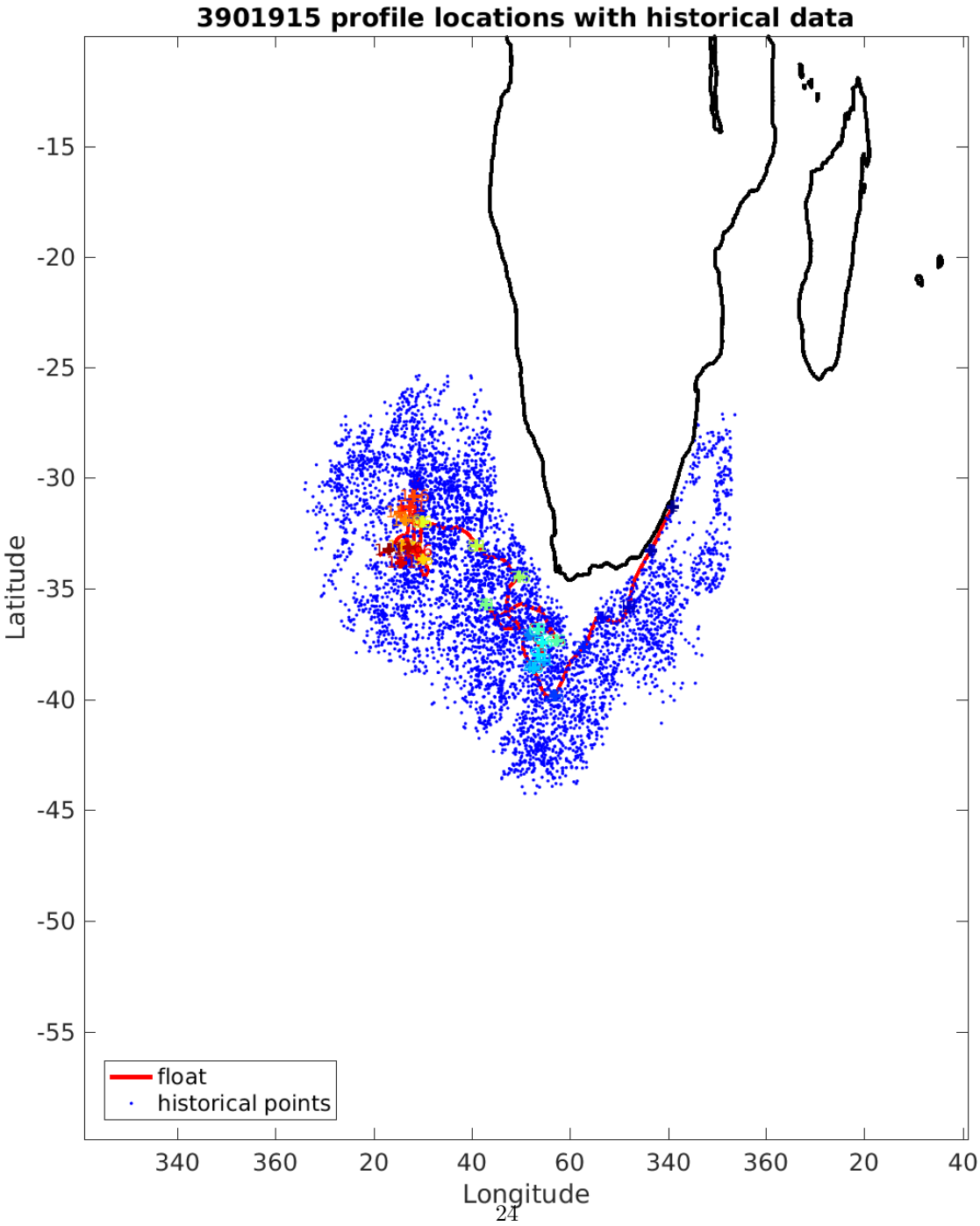


Figure 15: Float 3901915. Trajectory of the float with historical CTD data. The black contours indicate the bathymetry at 0, 200, 1000 and 2000 m.

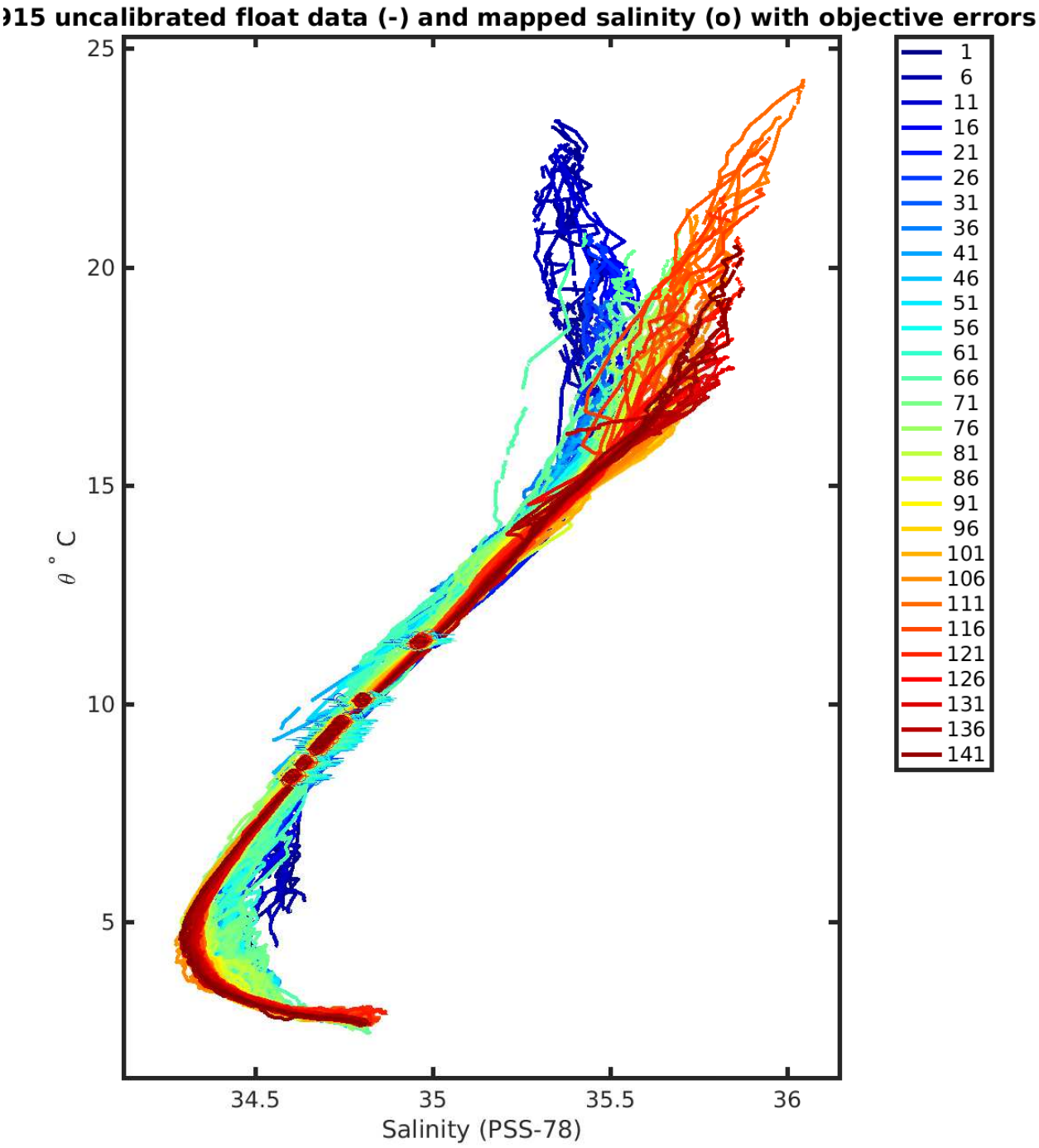




Figure 16: Float 3901915. Uncalibrated float data and mapped salinity.

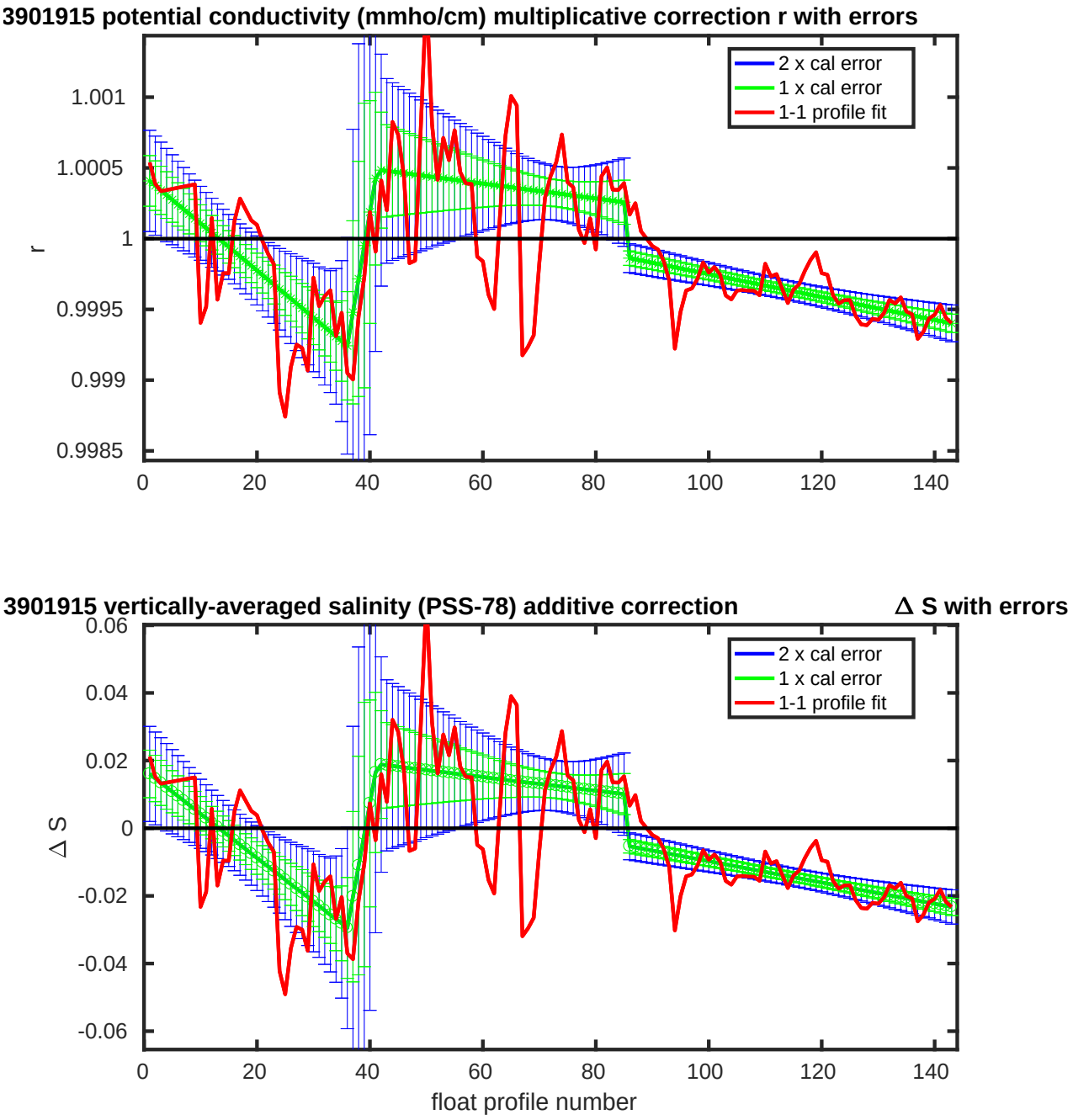


Figure 17: Float 3901915. Potential conductivity (top) and vertically averaged salinity (bottom) with errors.

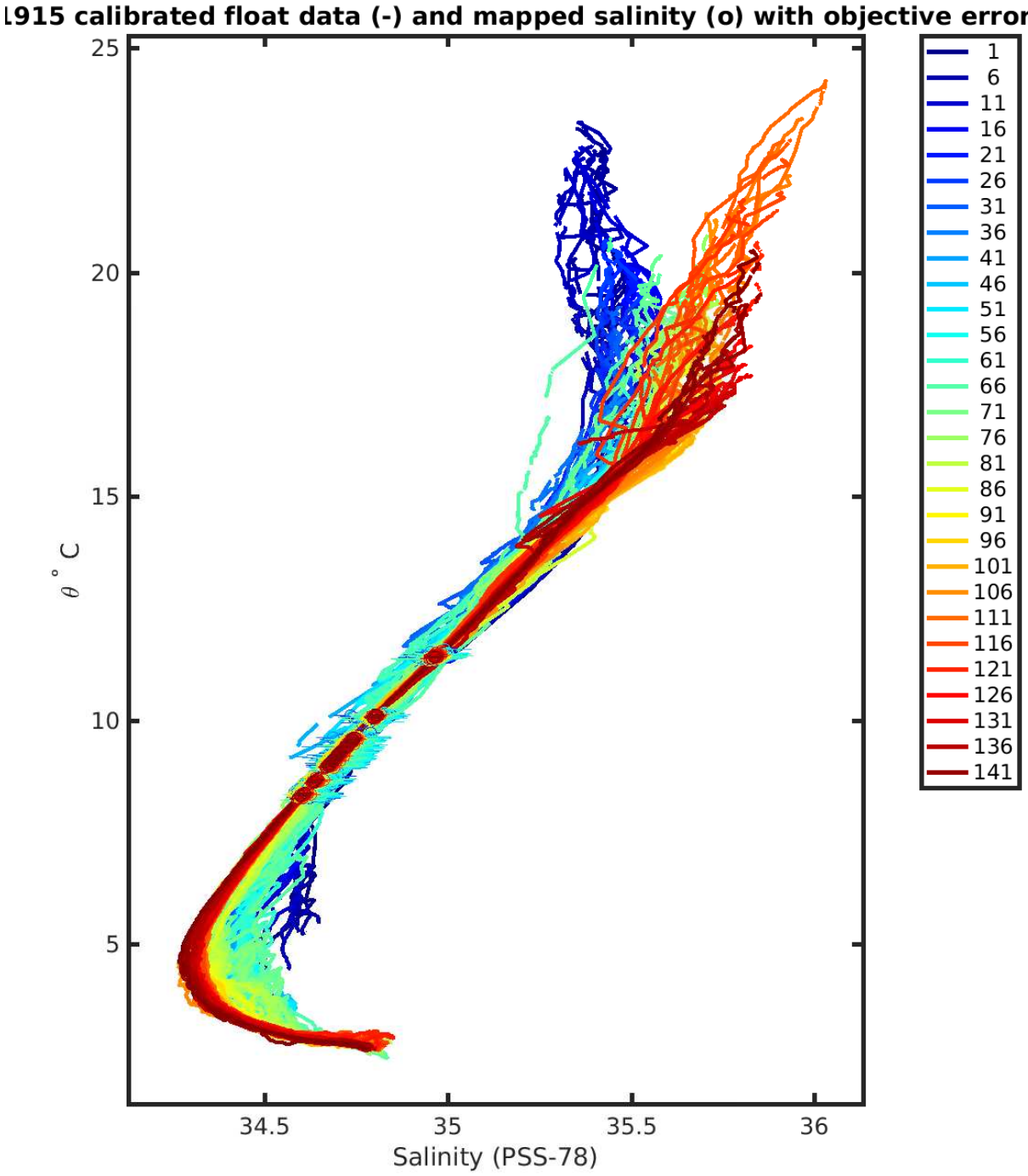




Figure 18: Float 3901915. Calibrated float data and mapped salinity.

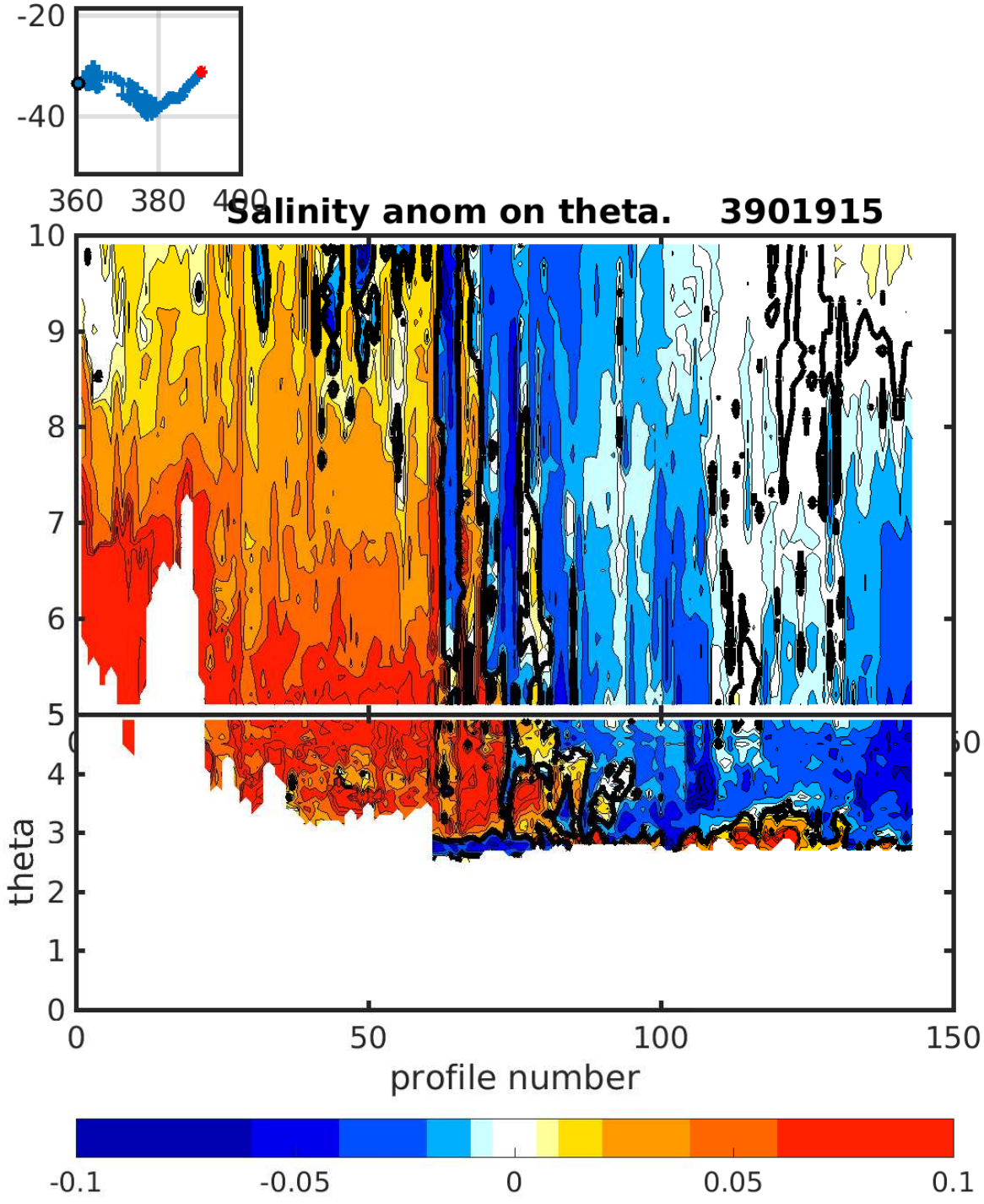




Figure 19: Float 3901915. Salinity anomaly on Theta

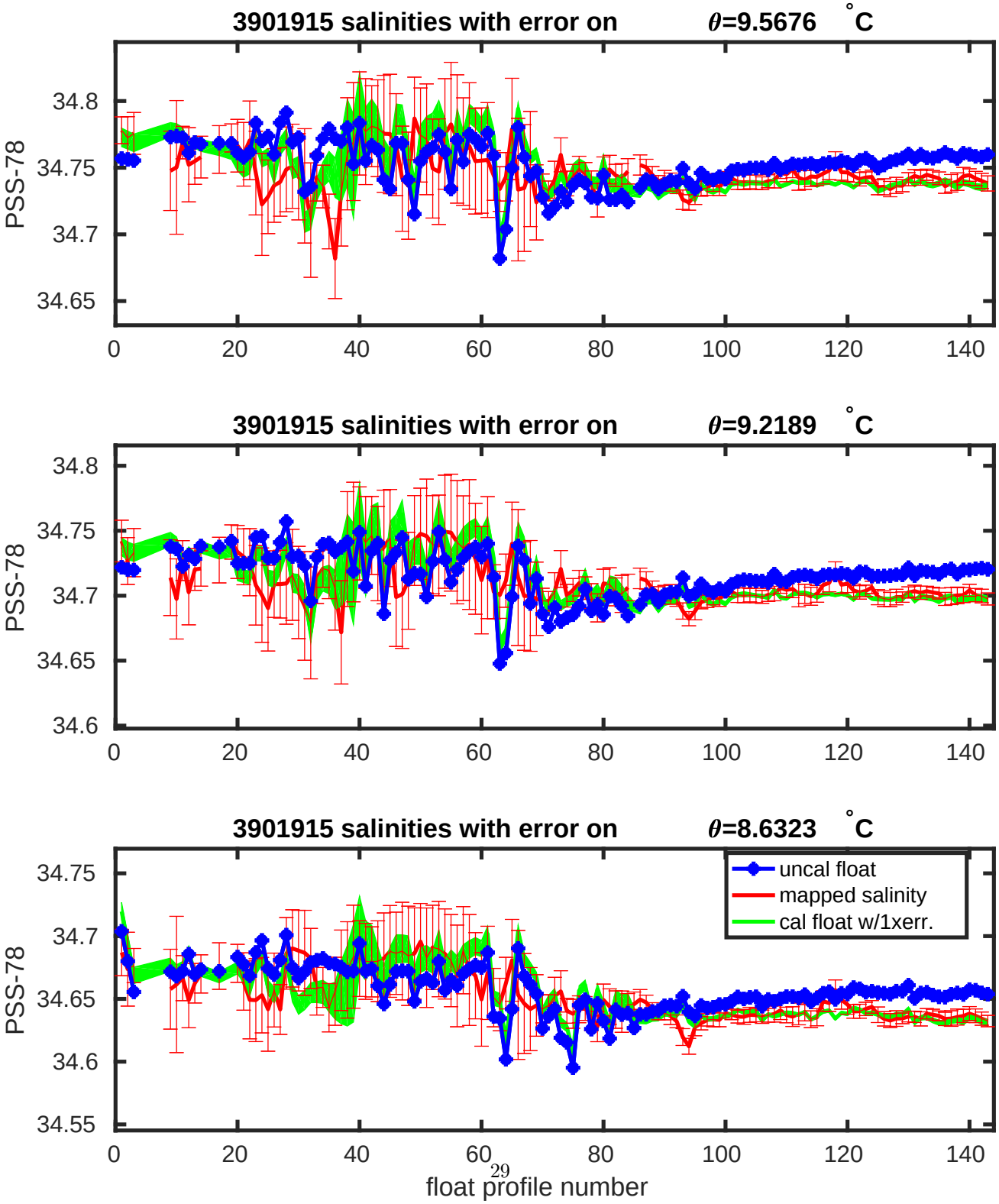




Figure 20: Float 3901915. Salinities with errors on $\theta$.

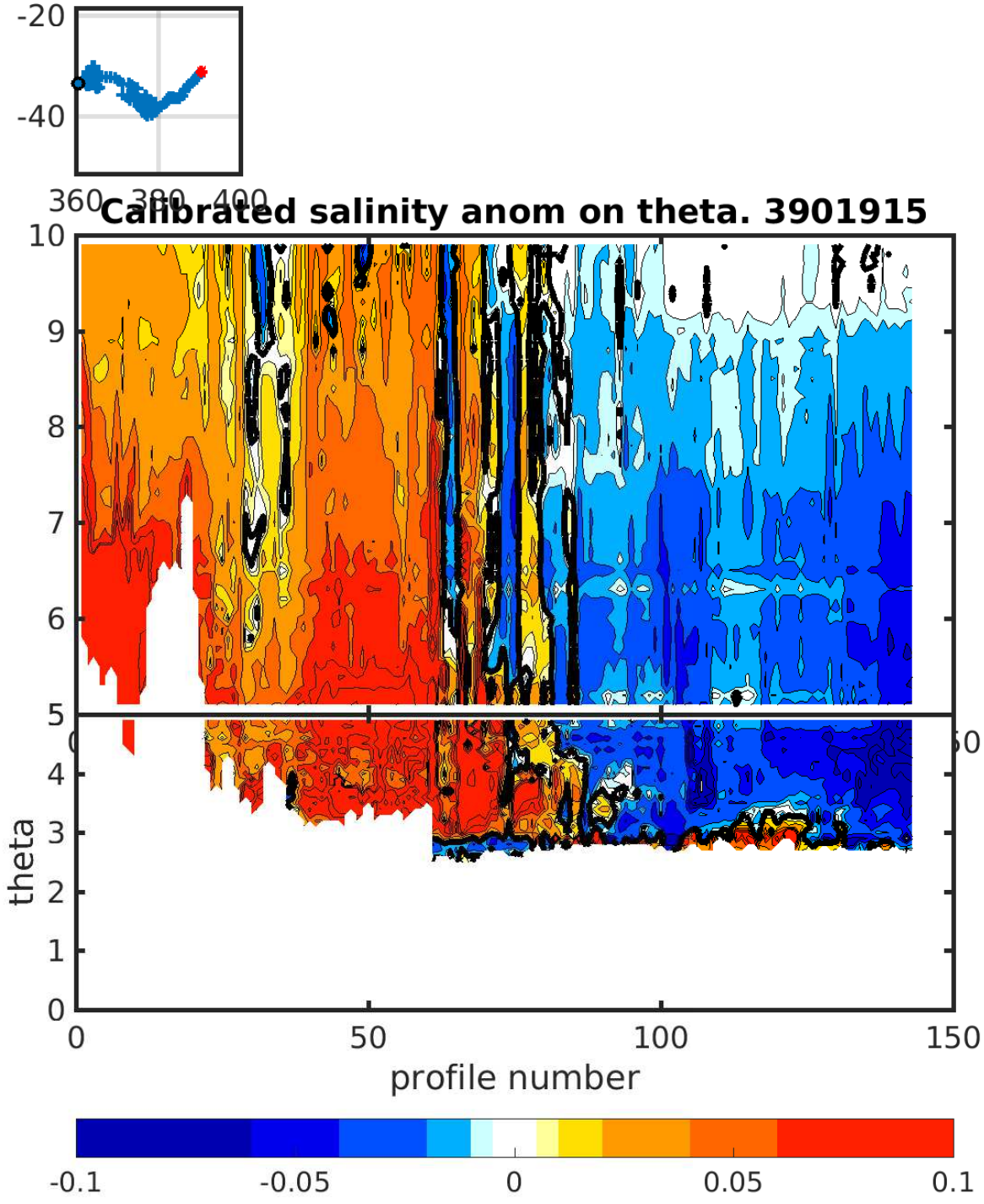




Figure 21: Float 3901915. Calibrated salinity anomaly on $\theta$.

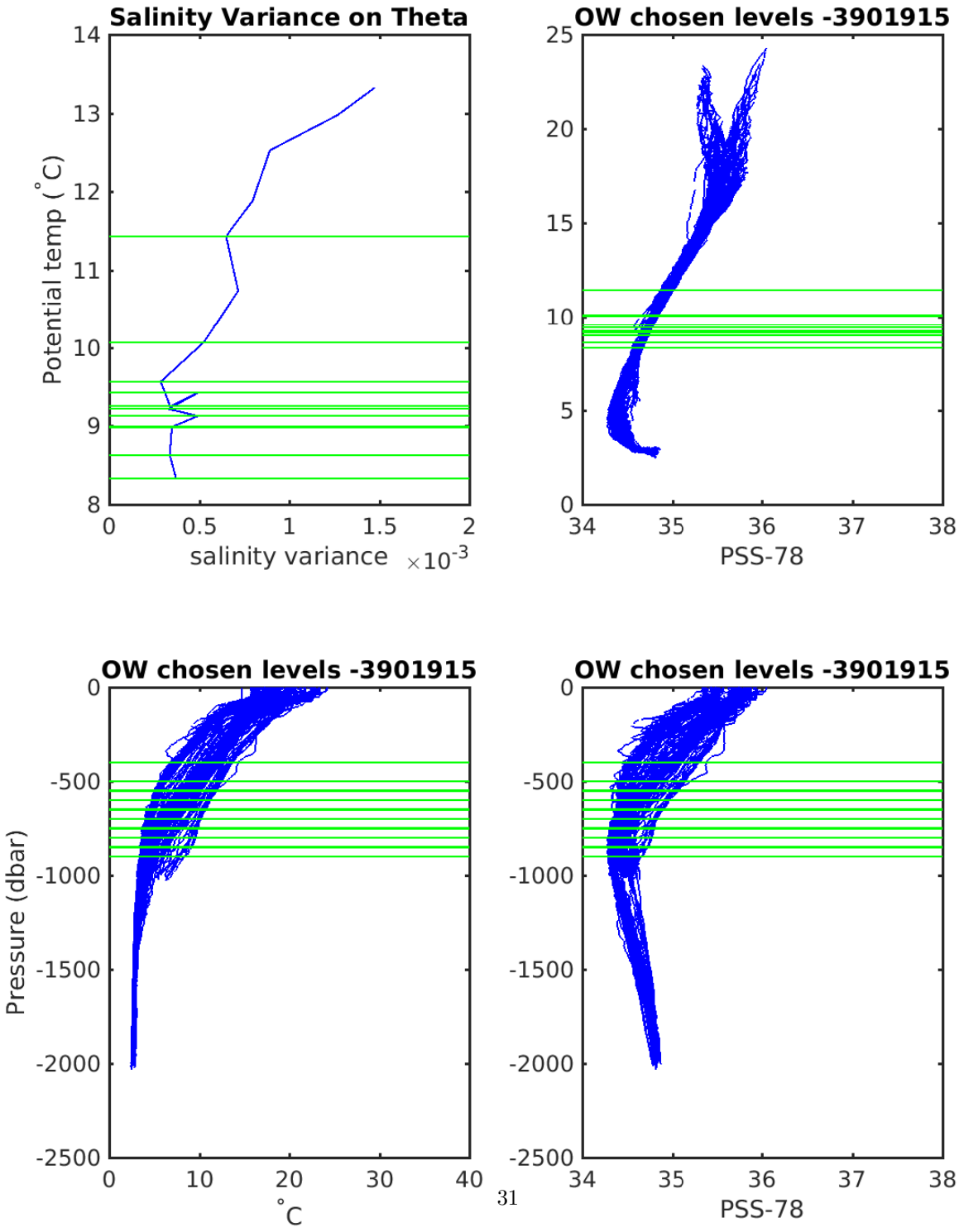




Figure 22: Float 3901915. Salinity, salinity variance on theta and OW chosen levels.

## 3.3 Summary and Conclusions

For the first part of the float life flat was driven by the Agullhas Current when after cycles 75 has been pushed northeastward by the Benguala Current. From the cycle around 100 to 143 there has been detected small drift. The theta levels were selected to be between 8 and 15 degree. This feature was confirmed by both CTD and Argo referenced data comparison. The OWC correction from cycle 100 was applied with an error 0.01, QC=1.

# 4 Final Checks

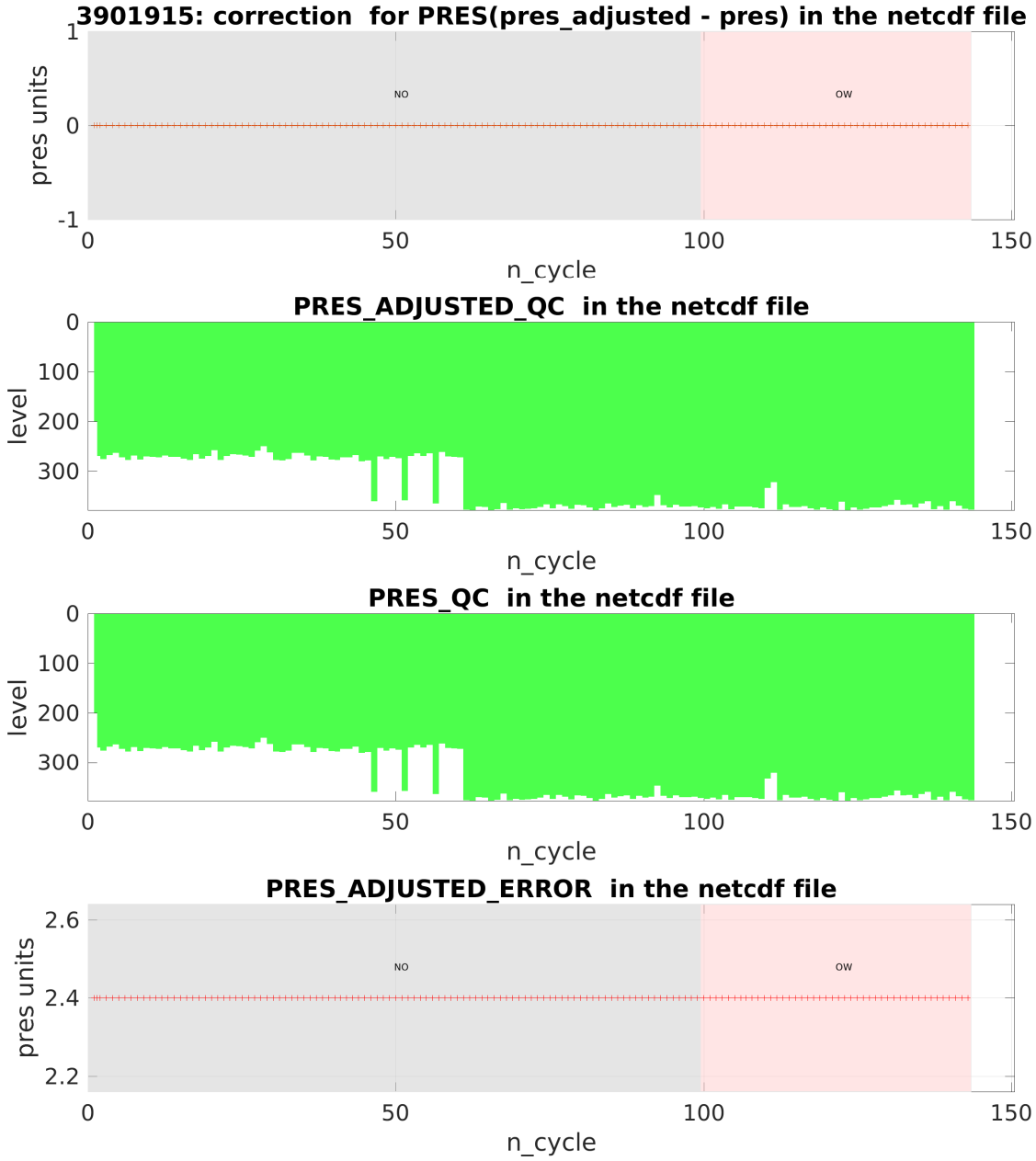




Figure 23: Float 3901915. Time series of applied pressure corrections.

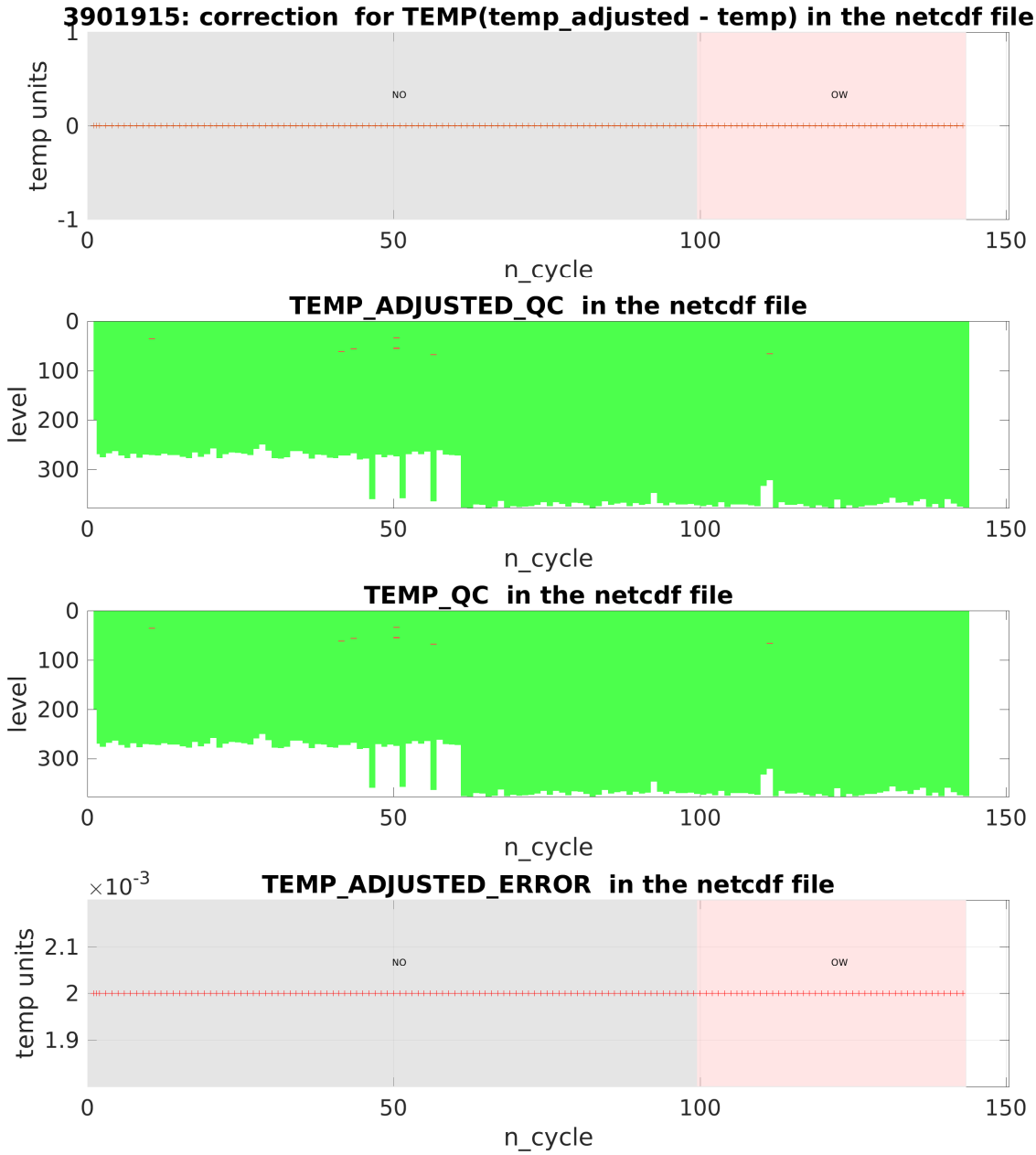


Figure 24: Float 3901915. Time series of applied temperature corrections.

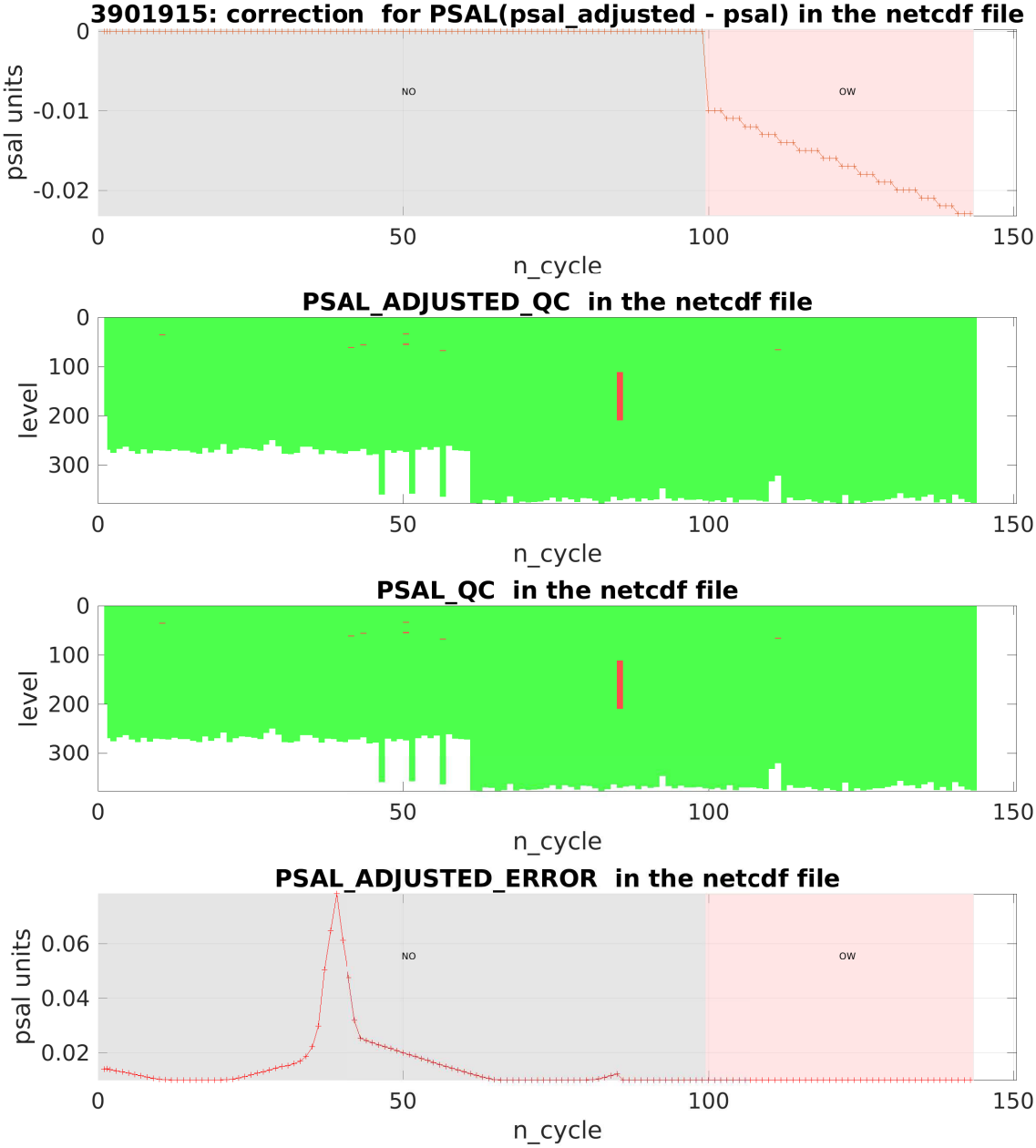


Figure 25: Float 3901915. Time series of applied salinity corrections.