

**ITP-136 Metadata**

Region: Beaufort Sea / Canada Basin  
 Ship and/or program: CCGS *Louis S. St. Laurent*; Beaufort Gyre Observing System (BGOS) JOIS 2022 cruise

Co-deployed instruments: Sunburst Sensors SAMI-C02 w/ODO & PAR @ 5m

Co-deployed platforms: Tethered Ocean Profiler (TOP-5)  
 US Army CRREL Seasonal Ice Mass Balance Buoy 2021 #7  
 Naval Postgraduate School Arctic Ocean Flux Buoy (AOFB) #47

	Date, Time (UTC)	Latitude	Longitude	
Deployment	25 Sept. 2022 22:00	79° 10.18'N	140° 16.75'W	Ice thickness: 1.2 m
Last Profile	4 Dec. 2023, 12:00	73° 29.19'N	135° 35.18'W	Profiler duration: 449 days
Last Location	5 Sept. 2024, 15:00	76° 01.72'N	132° 20.45'W	Surface package duration: 710 days

**Configuration:**

ITP profiler s/n: 15403-04  
 CTD sensor: Sea-Bird Electronics SBE-41CP s/n: 17168  
 AUX sensors: Aanderaa optode s/n: 968

**Data files:**

Number of records: 1736  
 Number of records longer than 10 meters: 1393

Quality Control flags: implemented

record flag value	pressure	temperature	conductivity	salinity
1 (good)	1736	1565	1596	1498
2 (questionable)	0	171	140	238

Location-only data file: itp136rawlocs.dat  
 Level III 1-db bin-averaged profile data: itp136\_level3g.nc  
 Level III 1-Hz timeseries profile data: itp136\_level3ts.nc

**Data Description:**

Profile type: one-way  
 Profile minimum depth: 7 meters  
 Profile maximum depth: 760 meters  
 Nominal profile rate: 4 profiles per day  
 GPS positions: half-hourly

**Data Processing Notes**

- Sporadic cases of conductivity cell fouling were observed, and these data were removed from the level 3 product.
- No corrections have been applied to the Aanderaa optode data in Level 3
- Profiler functioned normally up until about 5 August 2023 (record number 1250), at which point there was a steep drop in battery voltage indicating the profiler battery was nearly depleted. By 27 August (record 1550) the profiler was no longer profiling, and based on its location at this time, it was likely dragged over shallow topography for a time. By 19 October, it had drifted back into somewhat deeper water along the shelf break and managed to

sporadically return partial profiles until its batteries were fully exhausted. Corrections to temperature and conductivity from August 5<sup>th</sup> onward are questionable at best.

### Deployment Notes

Adapted from JOIS/BGOS 2022 cruise report (IOS Cruise ID 2022-045):

At 1445 UTC the LSSL settled into a large floe 0(1km) across, free of large ridges. There was some smooth topography (the floe was not completely flat) and melt ponds visible as grey patches under the snow covering. There was some cracking visible in the melt ponds, but a clear starboard side free of ice rubble. The ice was found to be about 1.1 to 1.9 m thick along a 130 m line running perpendicular from the ship's starboard side. TOP 5 was to be installed closest to the ship (about 25 m away from the hull), with ITP 136 situated for deployment at the far end of the line, and AOFB 47 and SIMB 2021 #7 between. TOP 5 and ITP 136 were deployed approximately 100 meters apart.

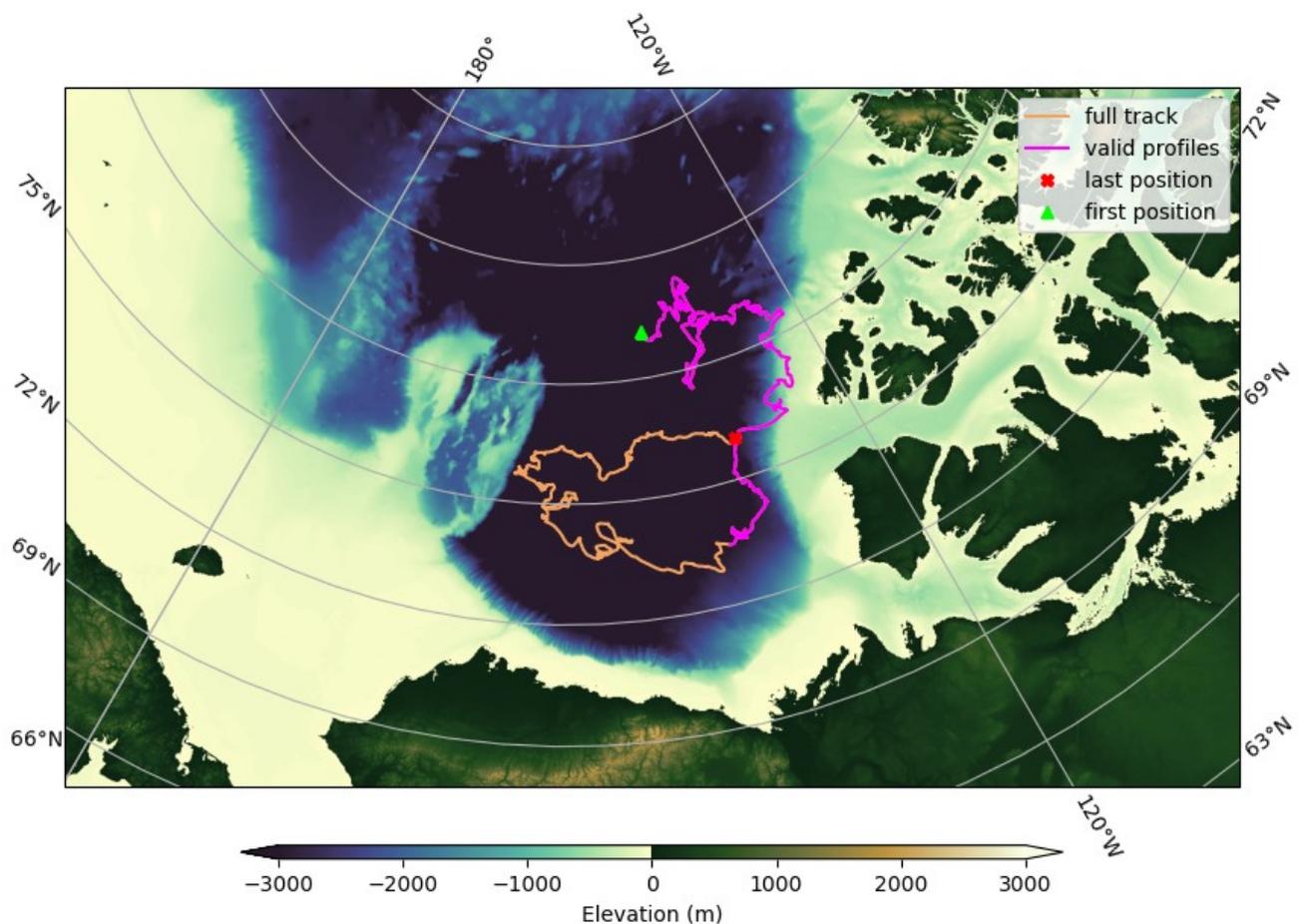


Figure 1: ITP-136 surface package drift track showing record locations (magenta), and locations with surface package data only (orange). The first profile location is marked with a green triangle, and the last processed position with a red 'x'.

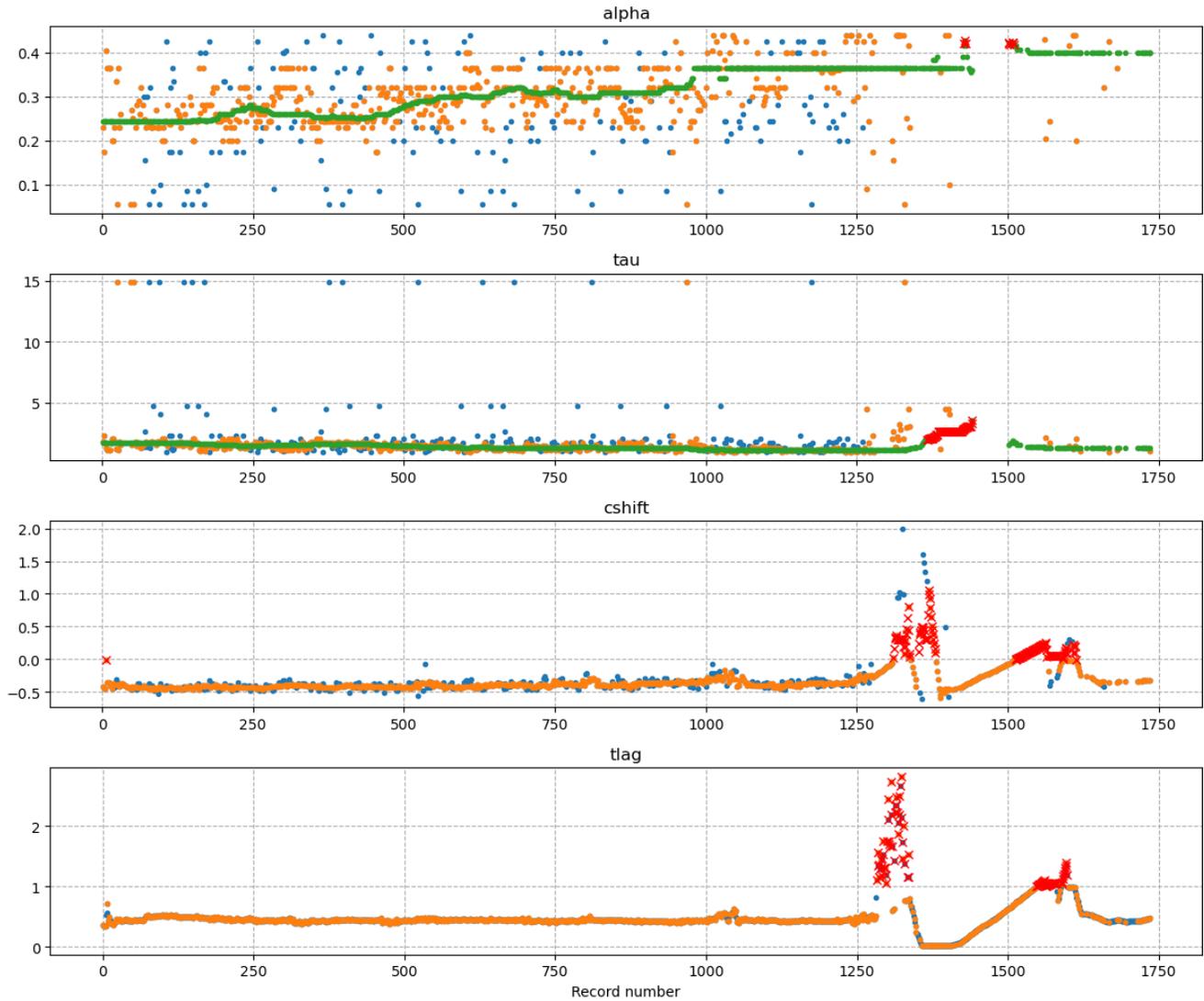


Figure 2: Time-series of per-profile corrections to raw data. Cell thermal-mass corrections ( $\alpha$  and  $\tau$ ), conductivity/temperature physical separation ( $cshift$ ) and thermal-lag correction ( $tlag$ ). Raw values are shown in blue, filtered values in orange, and for  $\alpha$  and  $\tau$ , a 100-point rolling median value in green, which is used for the thermal-mass correction. Points greater than or less than two standard deviations of the entire dataset median value (red 'x') have their corresponding records flagged as questionable.

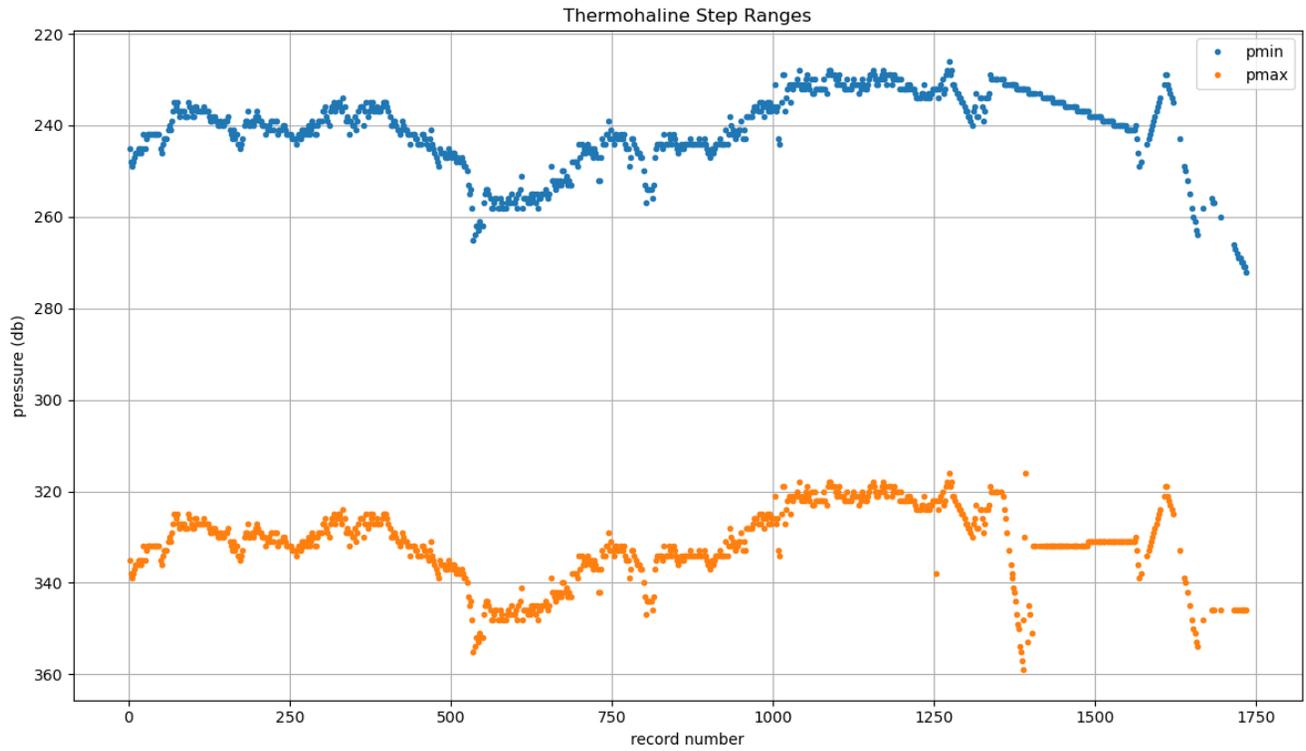


Figure 3: Upper and lower pressure bounds for thermohaline step-detection.

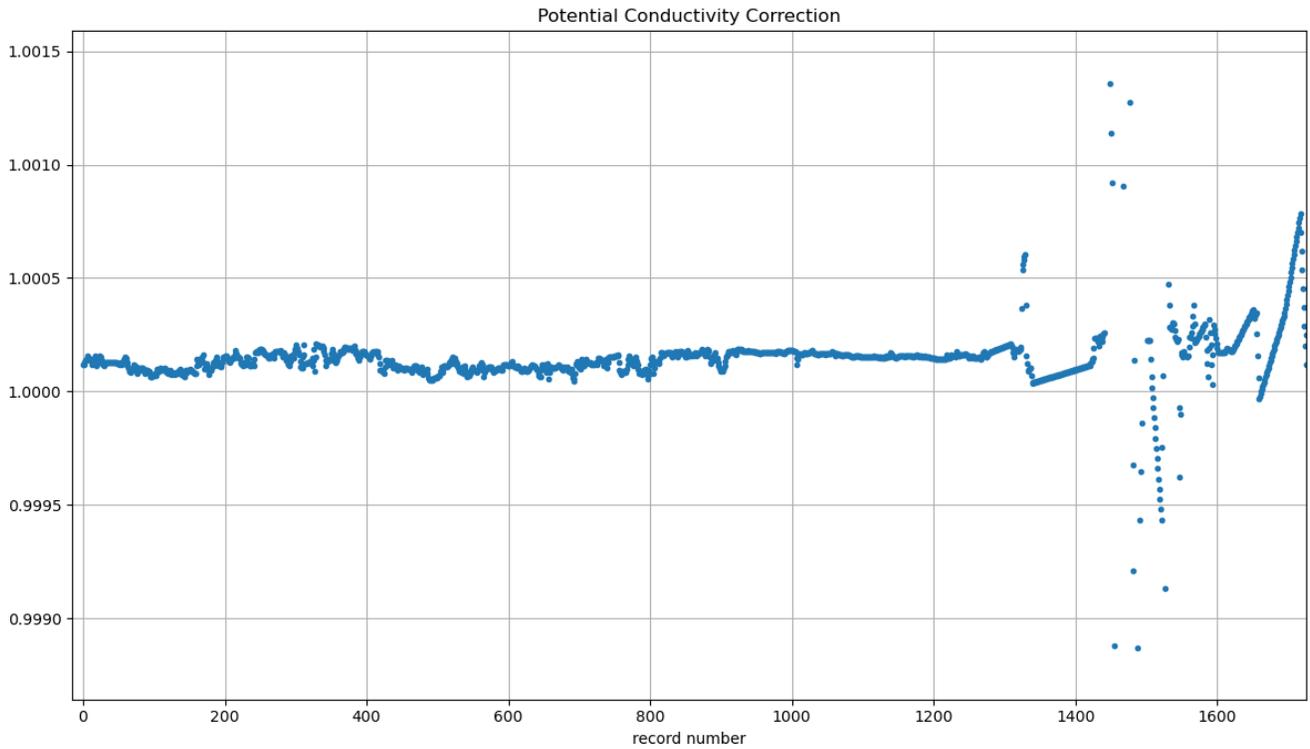


Figure 4: Potential conductivity correction factor based on historic values.

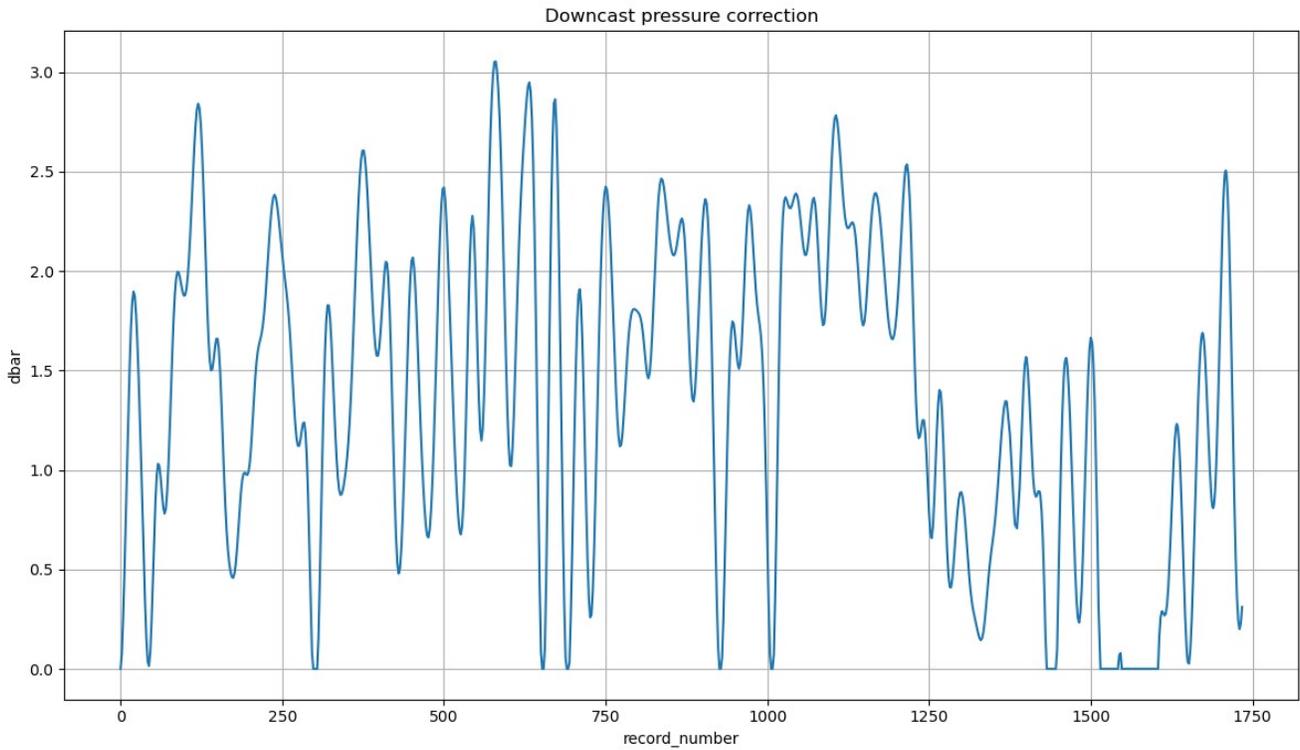


Figure 5: Drift-dependent correction to downward profile pressure values.

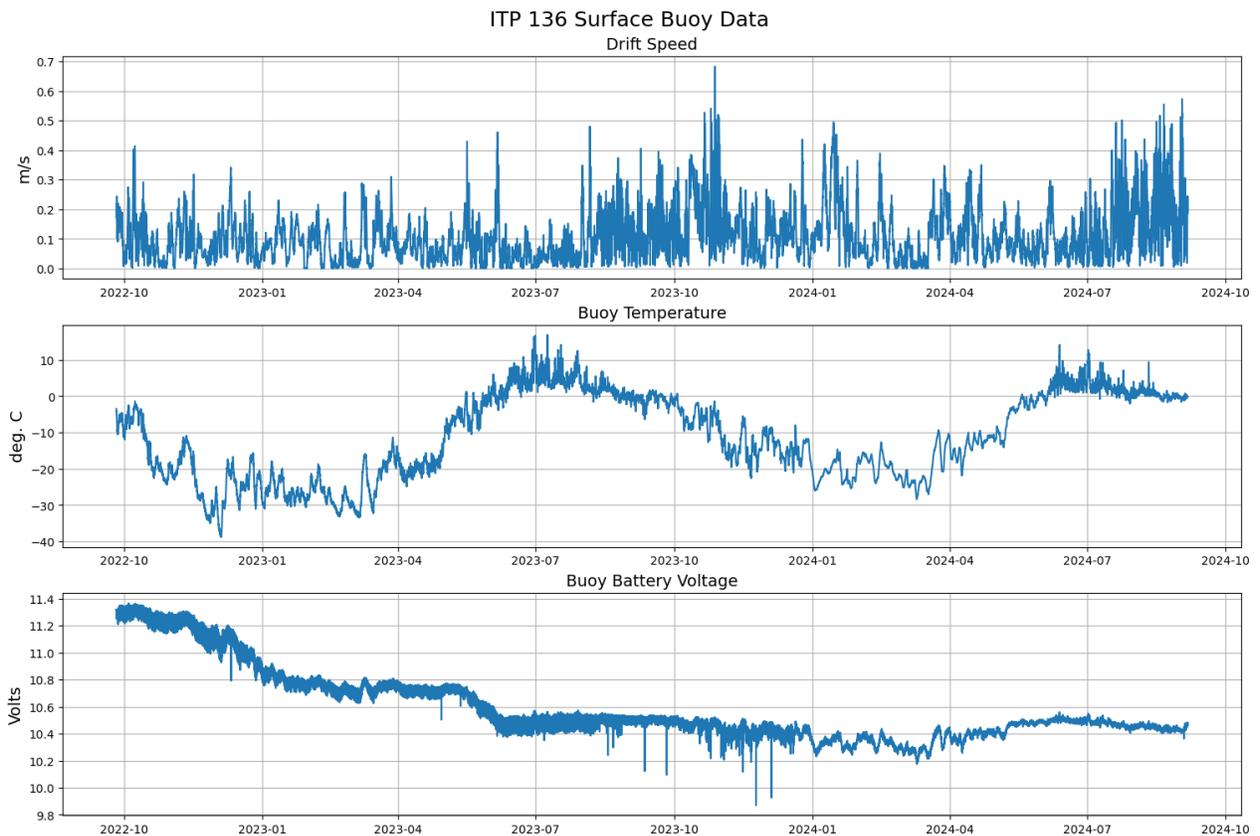


Figure 6: Surface buoy data showing drift speed derived from GPS position, along with controller's internal temperature and nominal battery voltage.

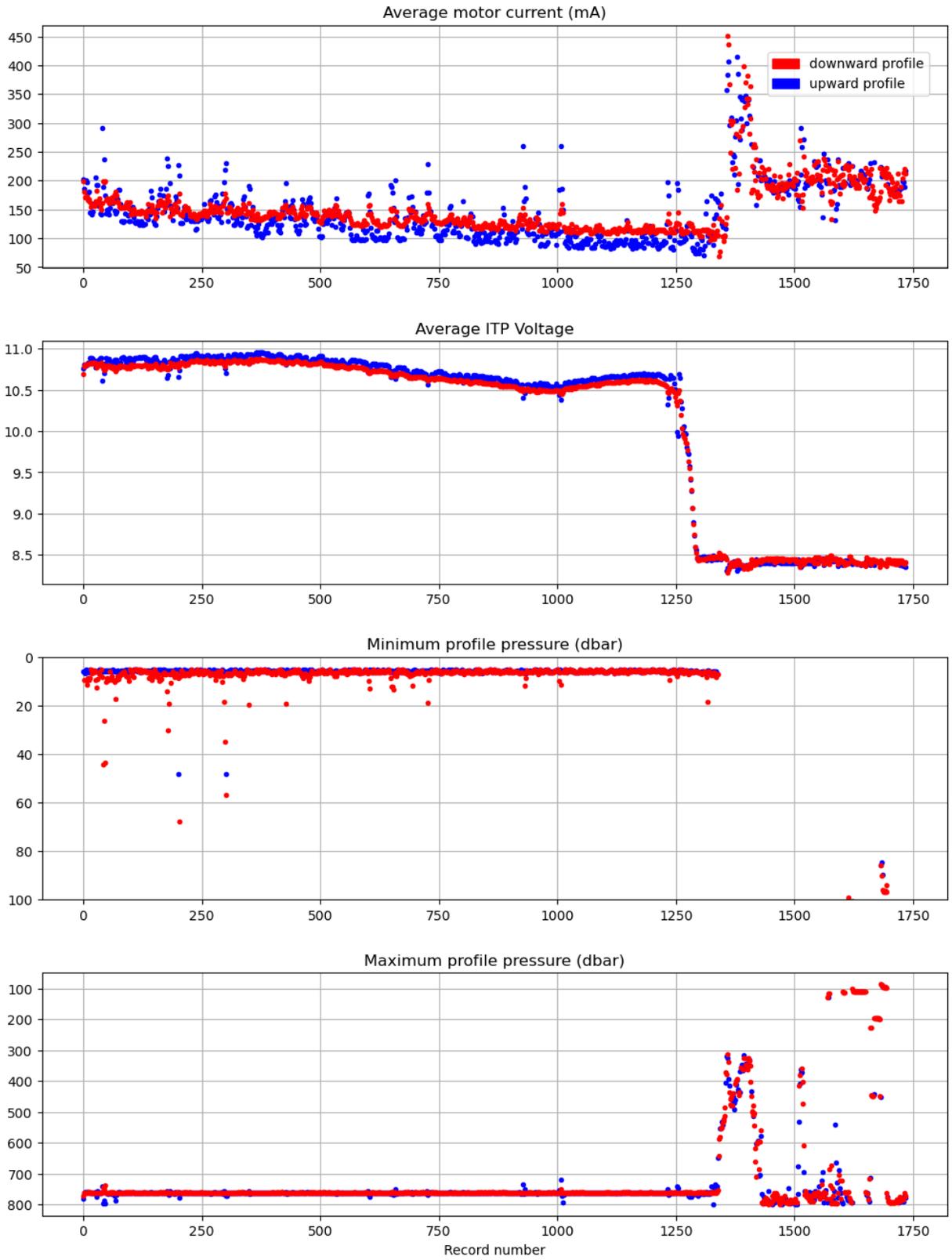


Figure 7: Profiler mean motor current and voltage for each profile, along with minimum and maximum recorded pressure values.

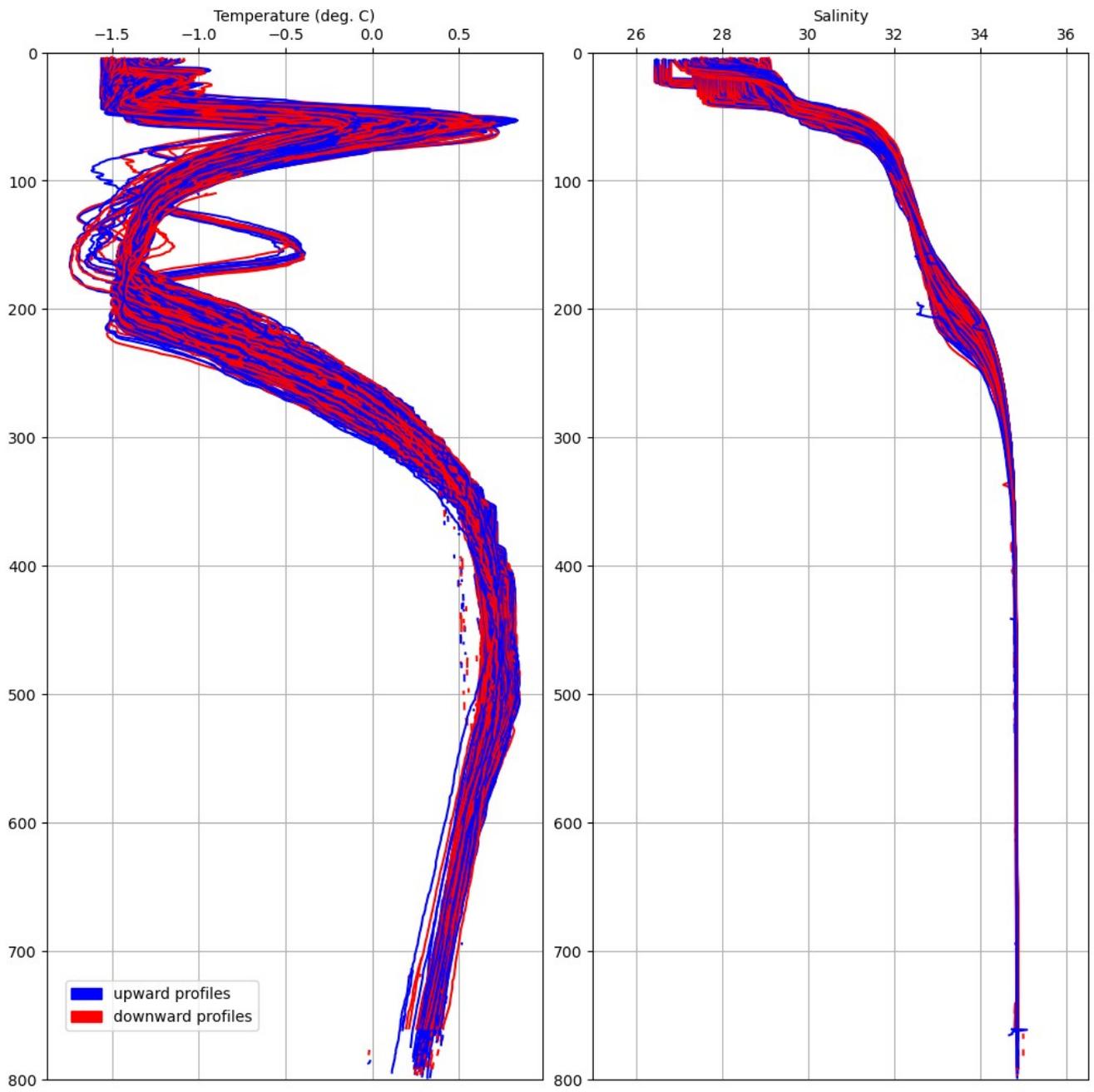


Figure 8: Level 3 edited and calibrated temperature and salinity profile history showing both upcasts (blue) and downcasts (red). Profiles flagged as questionable are included.

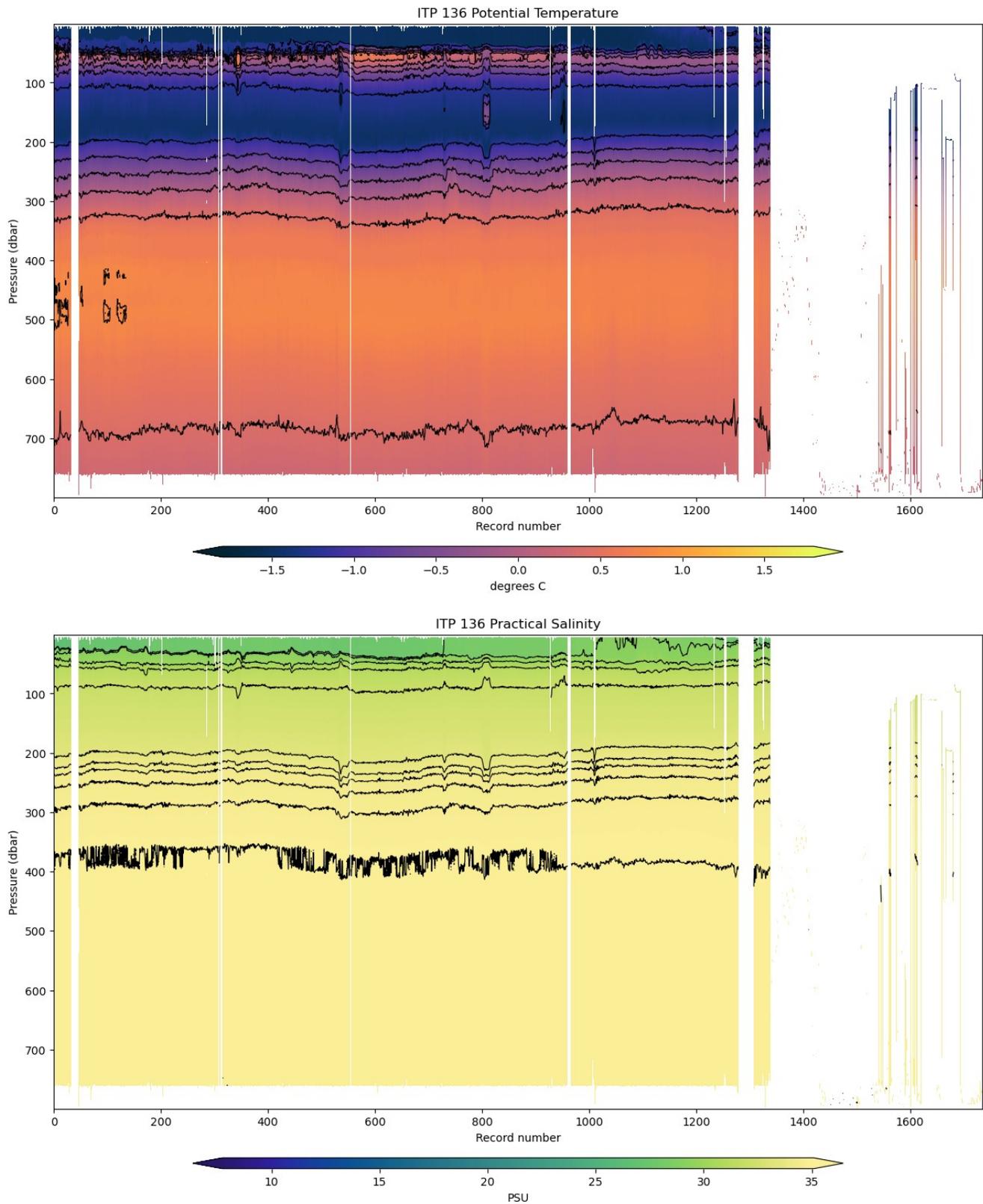


Figure 9: Level 3 corrected and edited potential temperature and practical salinity contour plots using 1 decibar bin-averaged values. Profiles flagged as questionable are included.