ITP32 Overview

Deployment Location: 10/4/2009, 02:40 UTC at 80° 19.4'N, 151° 45.7'W

Last Location: 10/14/2010, 23:00 UTC at 75° 6.7' N, 137° 53.7' W

Duration: 376 days

Distance Traveled: 1771 km

Number of profiles: 257 in 128 days

Other instruments: none

ITP 32 was deployed on a 3 m thick ice floe (in the same hole through the ice formerly occupied by ITP 8) in the Beaufort Sea as part of the Beaufort Gyre Observing System (BGOS) during the JOIS 2009 cruise on the *CCGS Louis S. St. Laurent*. The ITP operated on a standard sampling schedule of 2 one-way profiles between 7 and 760 m depth each day.

ITP 32 Deployment Operations

After a 4.5-hour recovery operation of ITP 8 (https://www.whoi.edu/page.do?pid=41519) from an ice floe that it had been deployed on 2 years earlier, ITP 32 was deployed in the 3-foot diameter hole through the ice previously occupied by ITP 8. Most of the deployment gear was already on the ice, so that transportation of the remaining items proceeded rapidly and within one hour after the recovery operation ended, the deployment of ITP 32 began. As the ice hole was already drilled, the equipment could immediately be lowered into the seawater, and only 1.5 hours later the ITP was fully installed, and the inductive modem circuit successfully tested.   Thirty minutes later, everyone was back onboard the ship, after swapping ITPs within a 7.5-hour time span.

ITP32 Data Processing

The 257 profiles that were recovered from the ITP were processed according to the procedures described in the ITP Updated Data Processing Procedures. The processing parameters for ITP 32 are shown in the figures to the right. **After November 2, 2009 profile locations are interpolated using Fowler and Tschudi (2003, updated 2013) sea ice motion vectors to infer drift, due to the absence of GPS locations from the buoy.** While there were a few occurrences where the drift speed exceeded 30 cm/s causing the profiler trouble climbing the wire, over 98% of the profiles spanned greater than 700 m.

Thermohaline staircases were present throughout most the time series, enabling CTD lag corrections. The vertical extent of the step region remained largely constant, and the sensor lags varied little. There were several instances where the potential conductivity exhibits some temporary shifts, but the dataset was largely absent of fouling.

Fowler, C. and M. Tschudi, 2003, updated 2013. Polar Pathfinder Daily 25 km EASE-Grid Sea Ice Motion Vectors. Boulder, Colorado USA: National Snow and Ice Data Center. Digital media. https://nsidc.org/data/nsidc-0116.html

ITP 32 Data Description

The ITP profiler was configured to operate with a standard sampling schedule of 2 one-way profiles between 7 and 750 m depth each day. In the surface package, the GPS receiver was powered hourly to obtain locations, and buoy temperature and battery voltage status were recorded.

After 11 days of reliable profile operation (24 profiles) and data transmission, the surface package ceased communicating until 344 days later (on September 24, 2010). When the system reappeared, it resumed sending archived status and profile data. However, presumably due to ice ridging and resetting of the surface electronics (perhaps due to a pinched communication cable), only 14 GPS locations were acquired and stored between November 2, 2009 and September 27, 2010. On the other hand, the profiler continued to operate and acquire profiles on schedule, and this backlog was gradually being telemetered by the surface package (along with current GPS locations) up until October 14, 2010, when the system ceased transmitting altogether. Ultimately, 257 profiles were provided by the profiler along the northern extent of the Beaufort Gyre circulation, and the locations of most of these had to be inferred from an external ice motion dataset.

The plots below are of the final, calibrated, edited data (as opposed to the raw data presented on the active instrument pages).
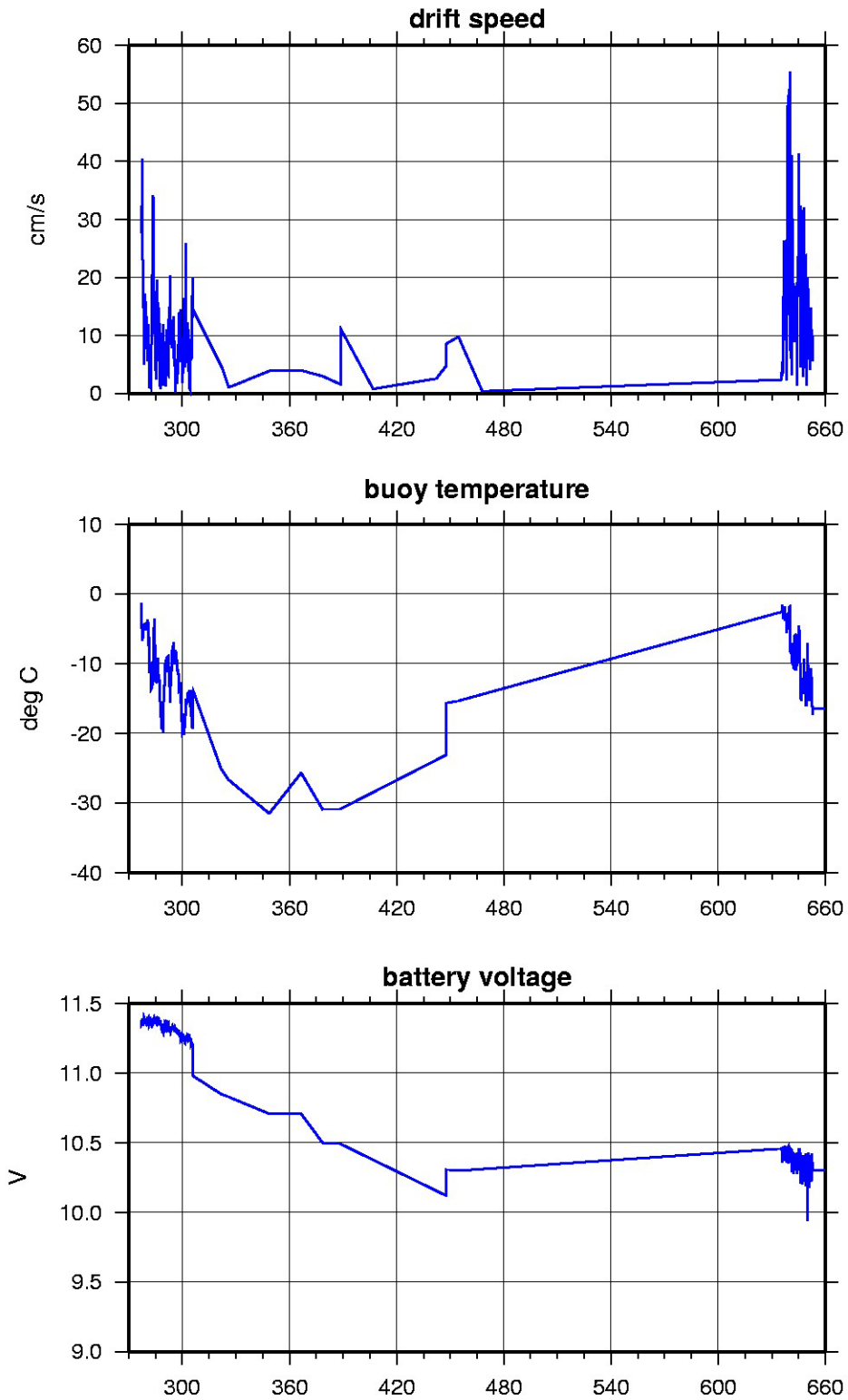
Level II hourly buoy location data in ASCII format: itp32rawlocs.dat

Level III 1-Hz processed profile data in MATLAB format: itp32cormat.tar.Z or itp32cormat.zip

Level III 1-db bin-averaged processed profile data in MATLAB format: itp32final.mat
Level III 1-db bin-averaged processed profile data in ASCII format: itp32final.tar.Z or itp32final.zip

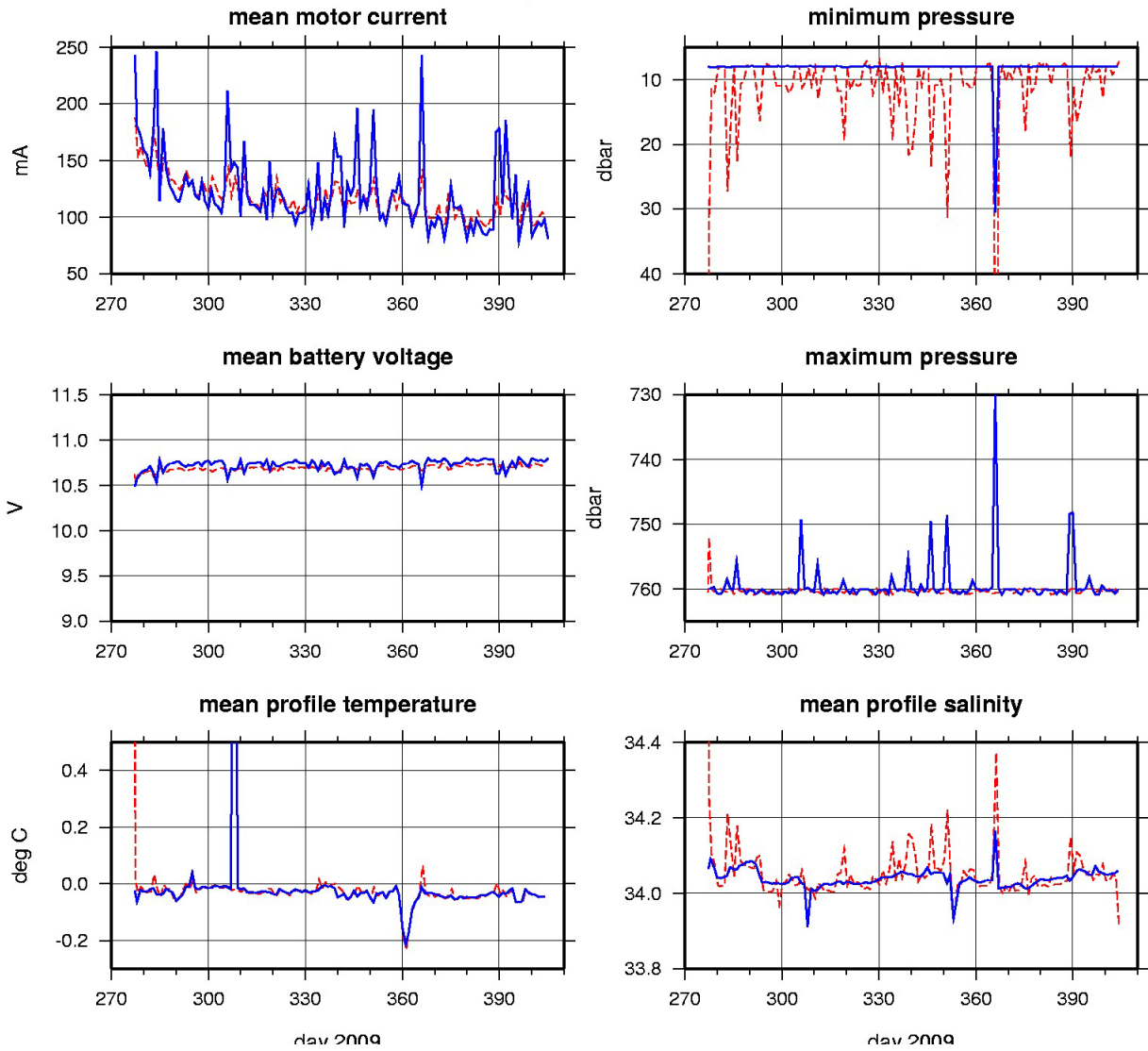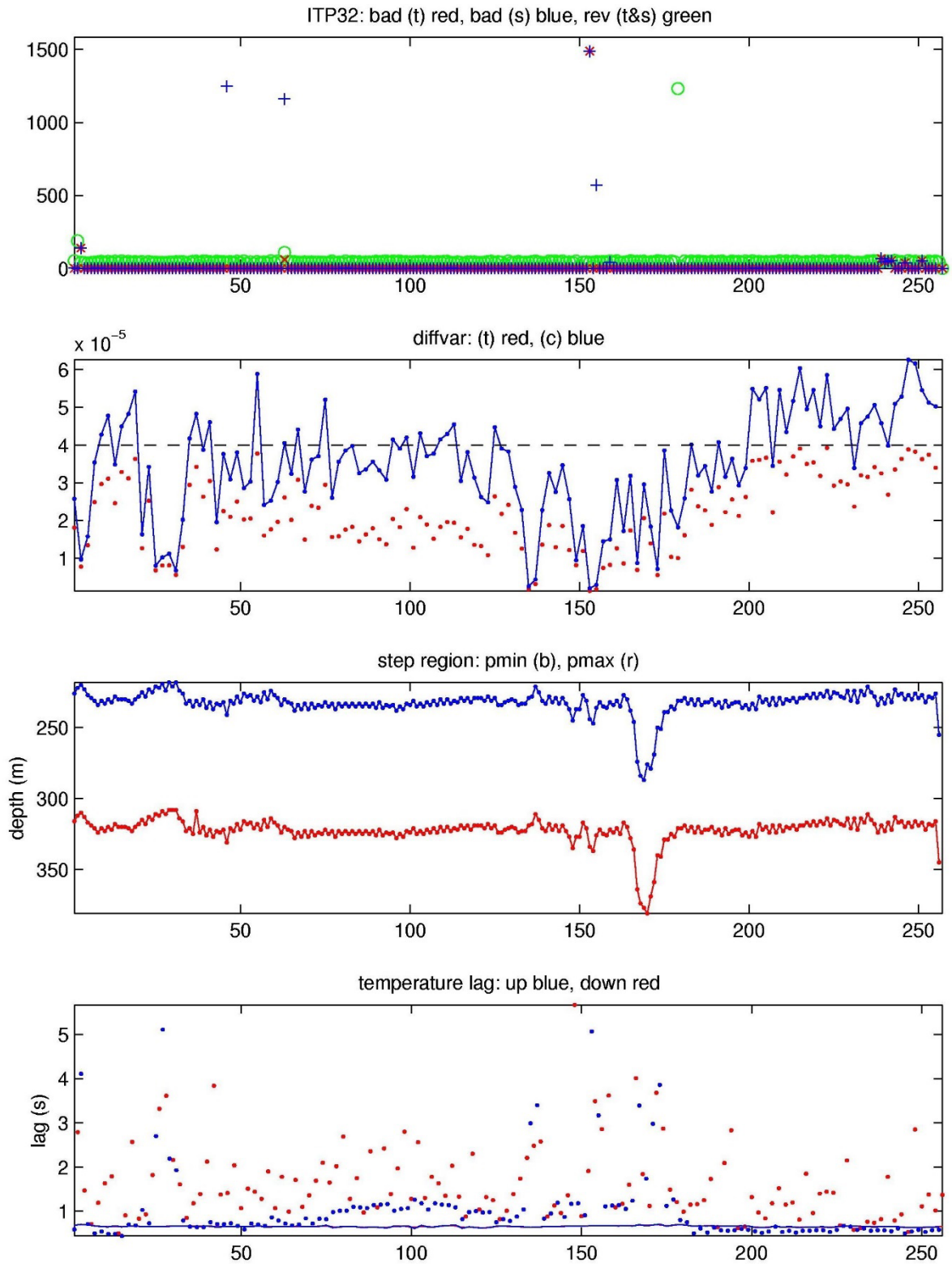## ITP32 Buoy Status (as of 2010/10/14)

drift speed

buoy temperature

battery voltage

day 2009

ITP Surface Buoy Status.

**ITP32 Profiler Status (up to profile 257)**

up solid, down dashed

mean motor current

minimum pressure

mean battery voltage

maximum pressure

mean profile temperature

mean profile salinity

day 2009

day 2009

ITP profiler engineering data.

Top: number of bad points removed, Middle: variance of verticle difference of temperature and salinity in step region for up-going profiles, Bottom: temperature lag
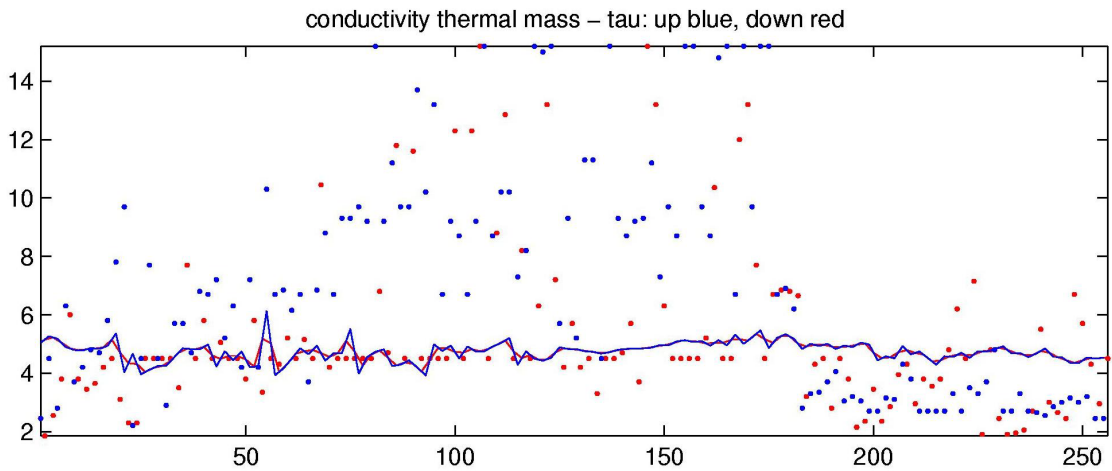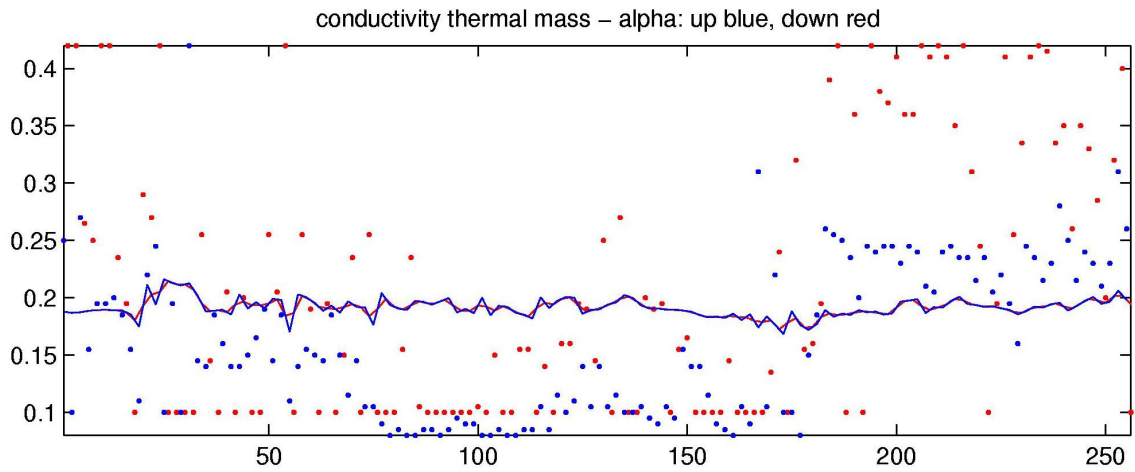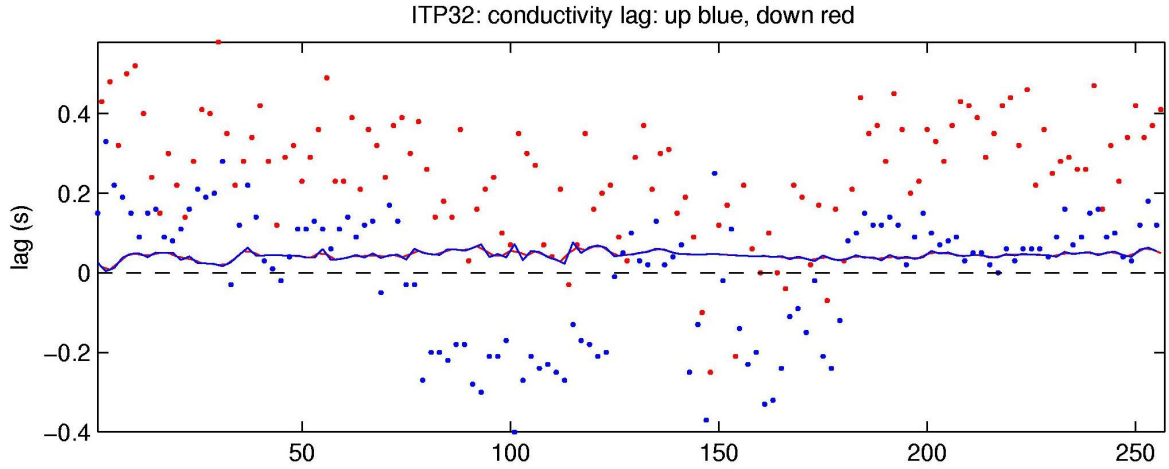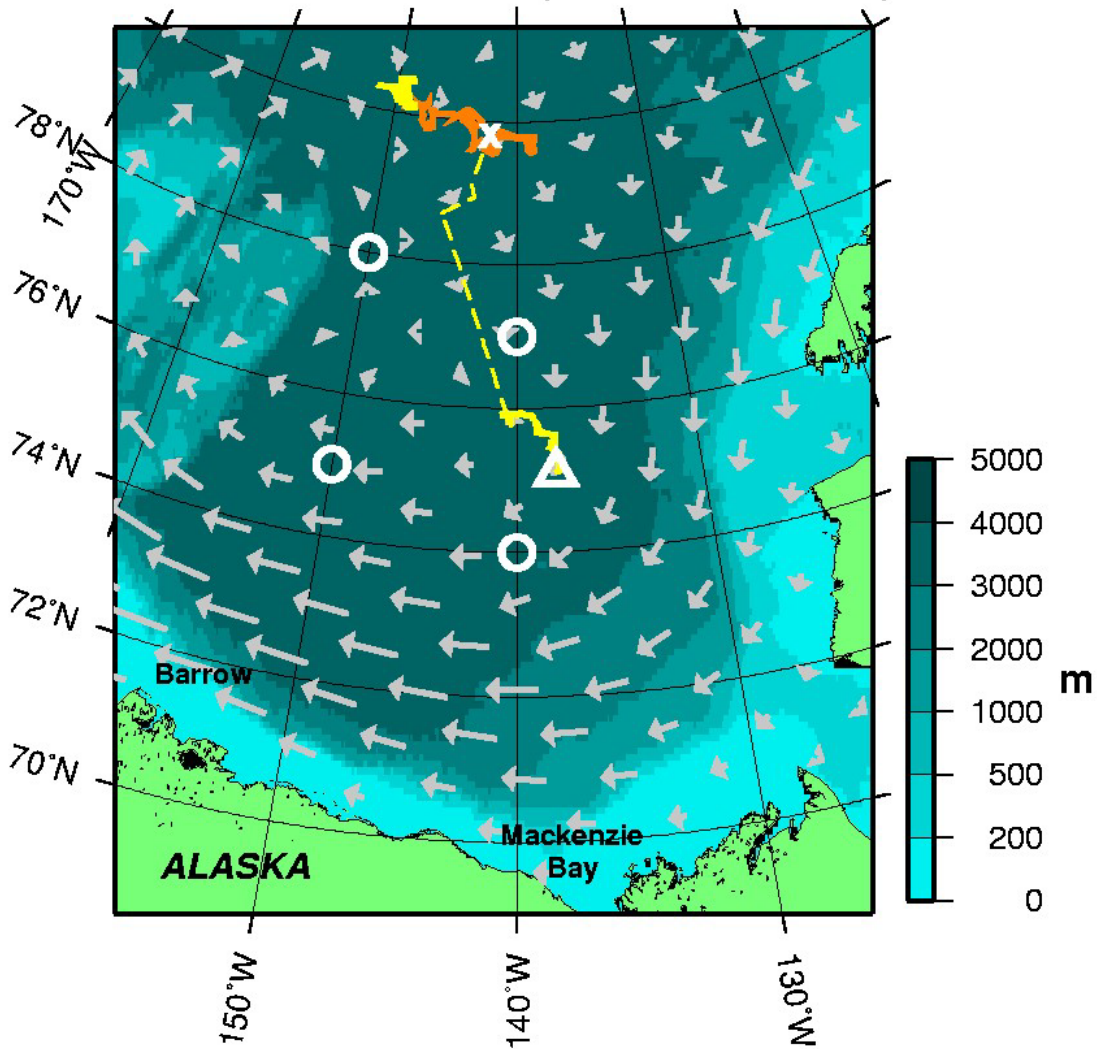
Top: conductivity lag, Middle: conductivity thermal mass amplitude correction, Bottom: conductivity thermal mass lag correction
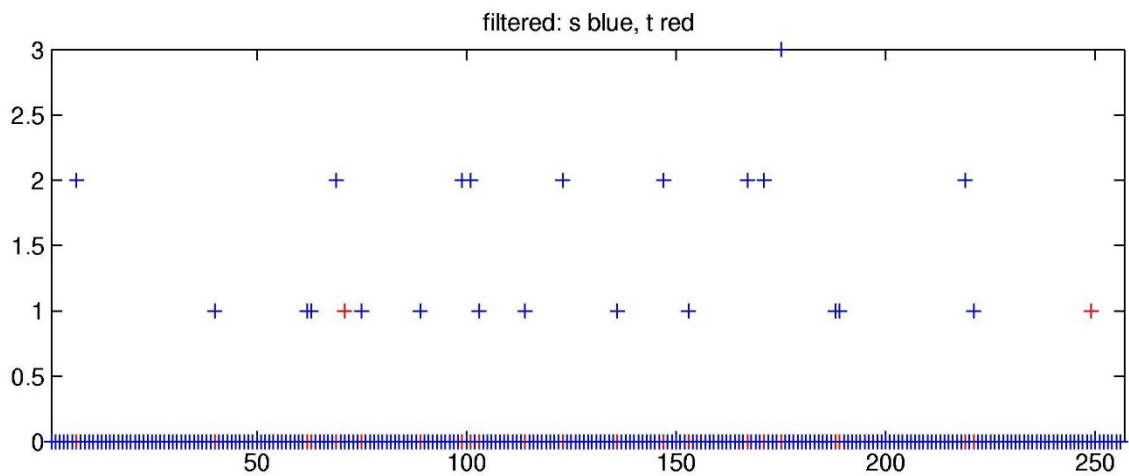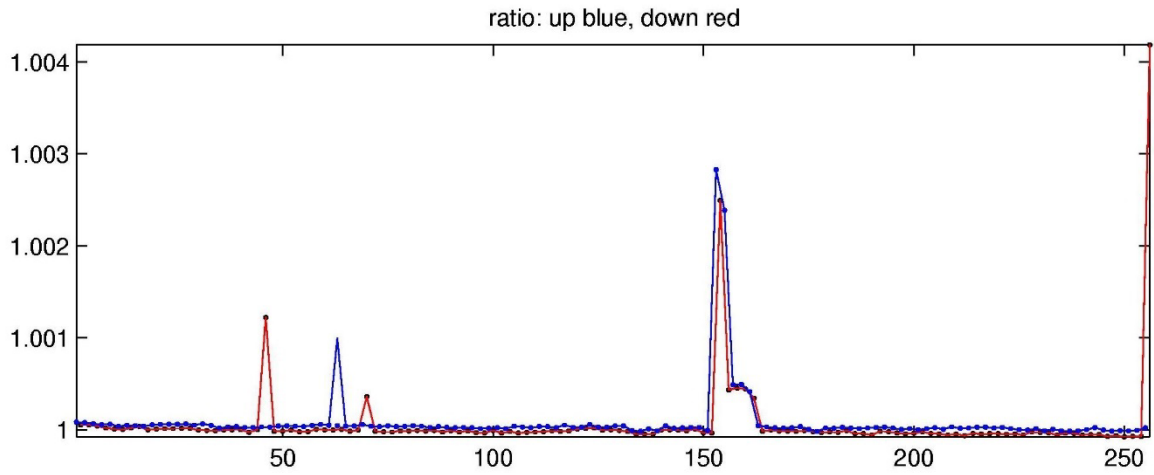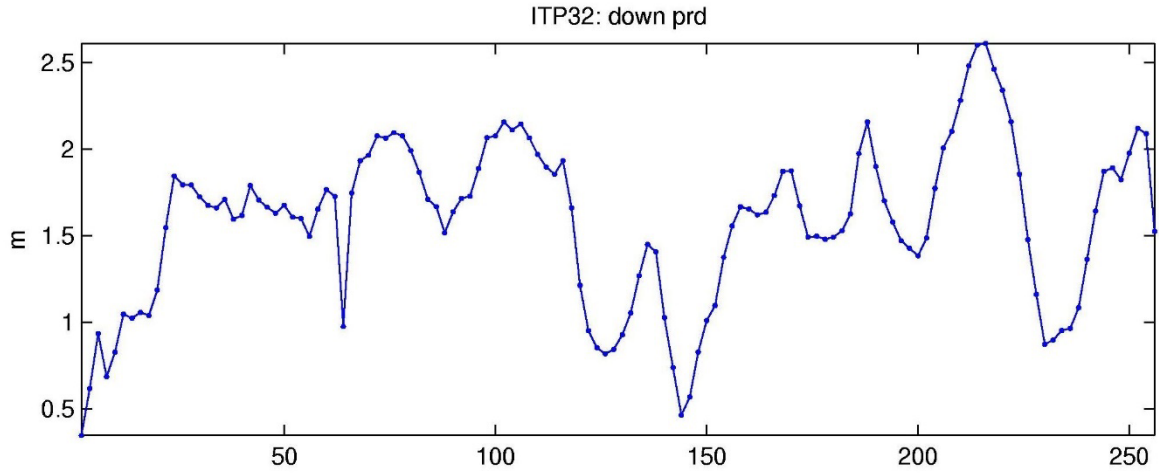
Top: down pressure deviation correction, Middle: salinity ratio adjustment, Bottom: Number of filtered spikes.
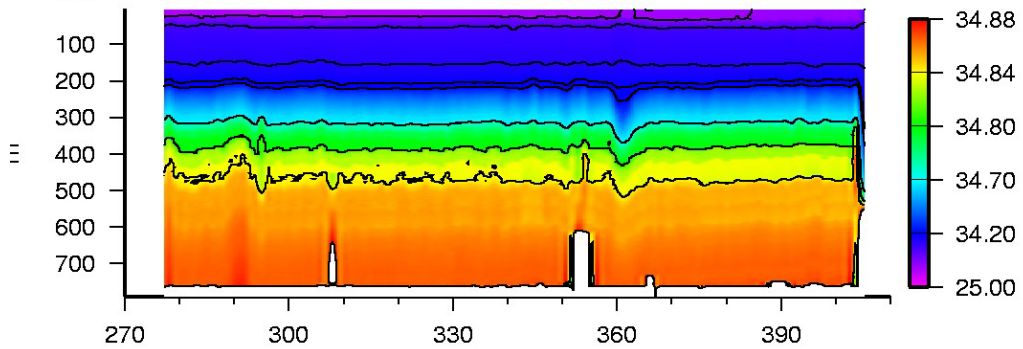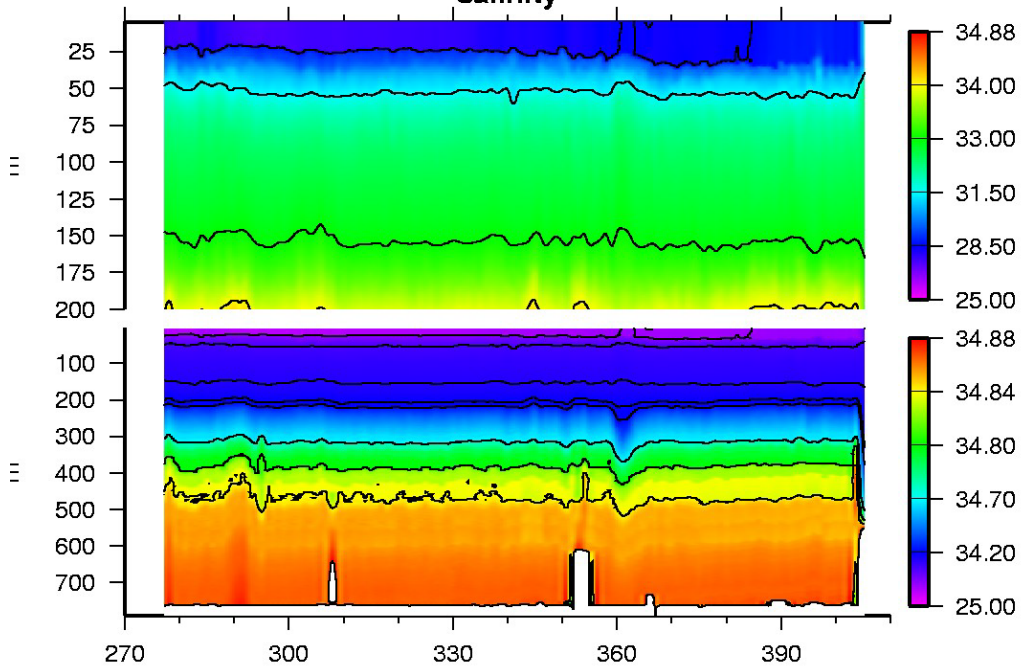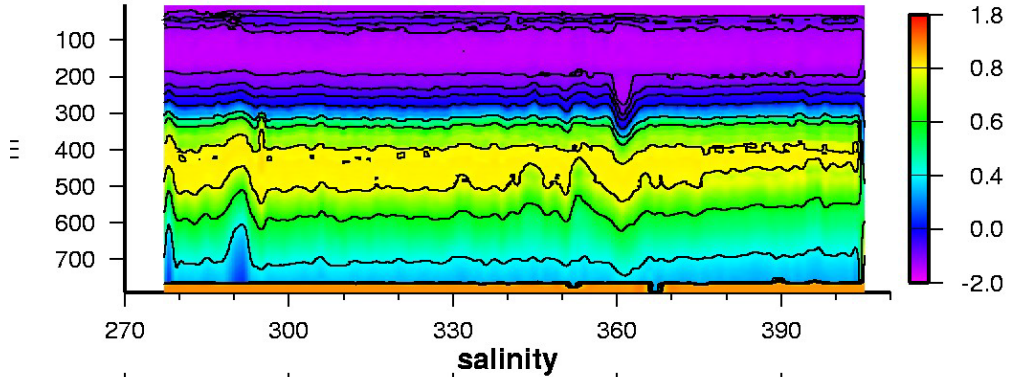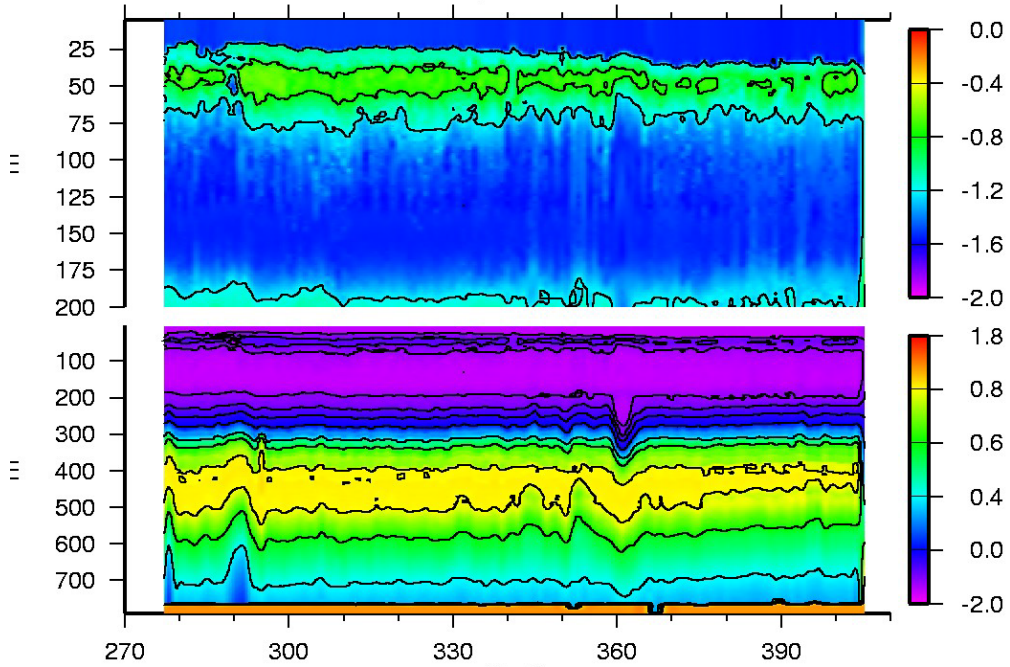
ITP32 Drift Track (as of 2010/10/14)

ITP drift (yellow lines), estimated drift (orange), last profile (cross), last location (triangle), BGOS moorings (circles) and annual ice drift from IABP (grey vectors) on IBCAO bathymetry (shading).

Plot of buoy locations.

ITP32 temperature and salinity contours.
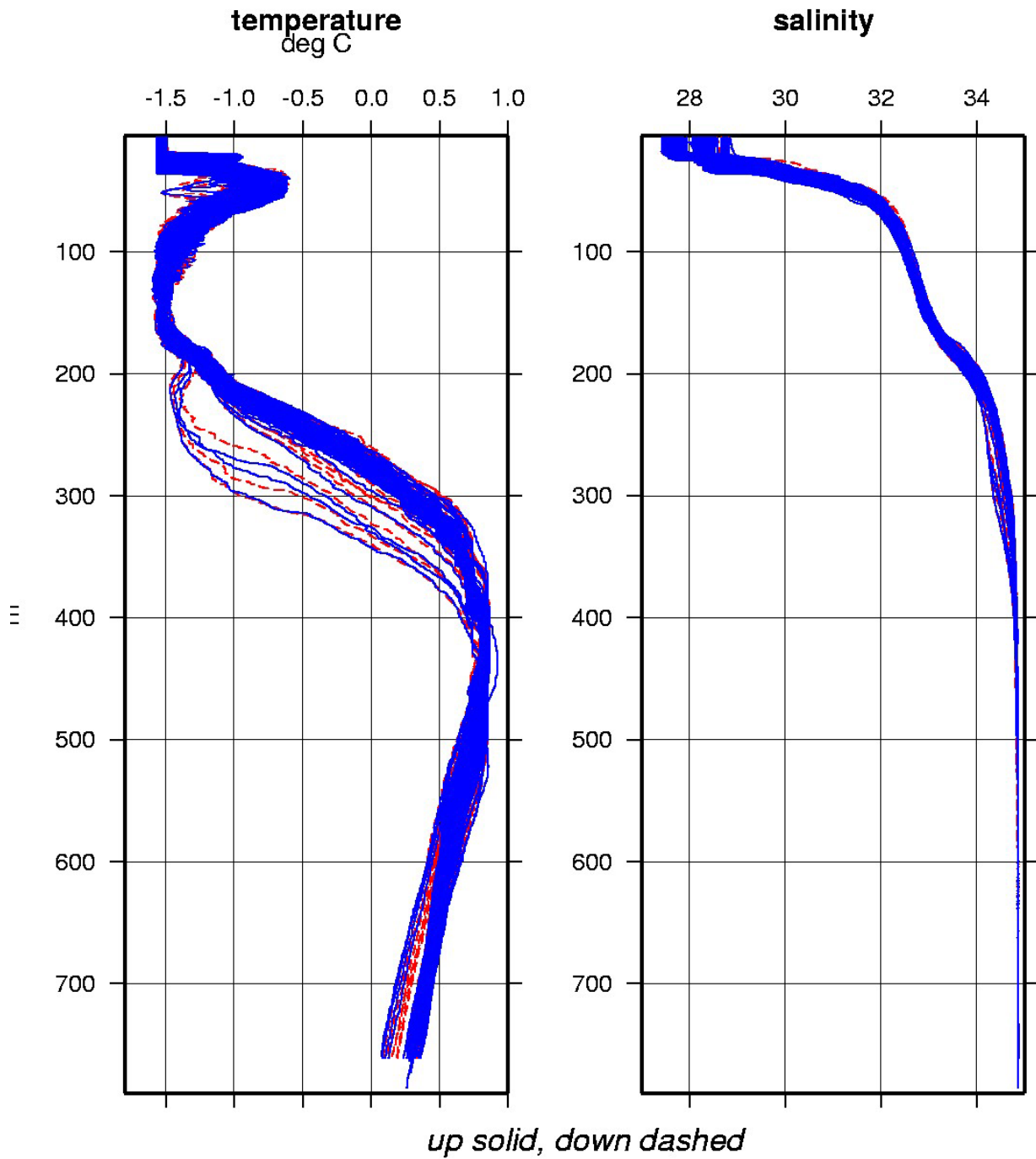
All ITP32 Profiles (up to profile 257)

temperature	salinity
deg C	

up solid, down dashed

Composite plot of ITP temperature and salinity contours.

After a long cold day and with dusk approaching, ITP 32 rests in the same hole through the ice that ITP 8 was recovered from, as the last slingload of gear is transported back to the CCGS Louis S. St. Laurent by the ship's helicopter. (Rick Krishfield)

Due to the limited visibility due to the approaching darkness, the helicopter hovers just above Gary Morgan as he attaches the last slingload of gear going back to the ship. (Rick Krishfield)