ITP 5 Overview

Deployment Location: 9/7/2006, 20:00 UTC at 75° 54.7'N, 138° 4.2'W

Last Location: 12/1/2007, 23:00 UTC at 79° 15.0' N, 149° 9.0' W

Duration: 450 days

Distance Travelled: 3741 km

Number of profiles: 1095 in 365 days

Other instruments: none

ITP 5 was deployed on a 3.0 m thick ice floe in the Beaufort Sea as part of the Beaufort Gyre Observing System (BGOS) during the JWACS 2006 cruise on the CCGS Louis S. St. Laurent. The ITP unit operated on a fast-sampling schedule of 3 one-way profiles between 7 and 760 m depth each day for exactly one year, then the profiler stopped. The surface buoy continued to transmit daily status for another 85 days.

ITP 5 Deployment Operations

An attempt to deploy ITP 5 on August 31, 2006 had to be aborted after the anchor was lowered through a 10 inch diameter hole in a 3.4 m thick ice floe. The anchor wedged under a floe rafted beneath the first, and eventually the end of the tether wire had to be cut to recover the rest of the mooring hardware. A replacement anchor was modified from 250 lb of used mooring chain so that a week later the system could be deployed on a small 3.1 m thick ice floe in loose ice conditions. In an afternoon operation just over 3 hours, an ice floe was surveyed and selected, the gear transported, ITP 5 installed and inductive modem communications with the profiler verified while still on the ice.

ITP 5 Data Processing

The 1095 profiles that were recovered from the ITP were processed according to the procedures described in the ITP Data Processing Procedures. The processing parameters for ITP5 are shown in the figures to the right. The time series remained practically stationary for most of its lifetime, only heading north for the last 100 days of its lifetime. There are several possible eddy encounters particularly in the range between 50 and 150 m. There are no unexplained instrument resets, and only four profiles that didn't go the distance: 296, 962, 963, and 1095. Towards the end, the profiler was having trouble making it all the way through profiles before timing out. Sensor lags in the later half of the time series do not have the benefit of clear thermohaline staircases, so the lags are less certain. In the final product, no profiles contained more than one bad temperature measurement, and 1051 (96.9%) have no more than one bad conductivity spike.

ITP 5 Data Description

The ITP profiler was configured to operate with an accelerated sampling schedule of 3 one-way profiles between 7 and 760 m depth each day as there was a good chance that the system might drift into shallow topography. In the surface package, the GPS receiver was powered every hour to obtain locations, and buoy temperature and battery voltage status were recorded.

After 365 days (and 1095 profiles) of reliable operation and data telemetry, communications with the ITP profiler broke down. The surface buoy continued to provide GPS locations for another 85 days but could not connect with the profiler which continued to ring the surface package 3 times per day.

Level II hourly buoy location data in ASCII format: itp5rawlocs.dat

Level III 1-Hz processed profile data in MATLAB format: itp5cormat.tar.Z or itp5cormat.zip

Level III 1-db bin-averaged processed profile data in MATLAB format: itp5final.mat
Level III 1-db bin-averaged processed profile data in ASCII
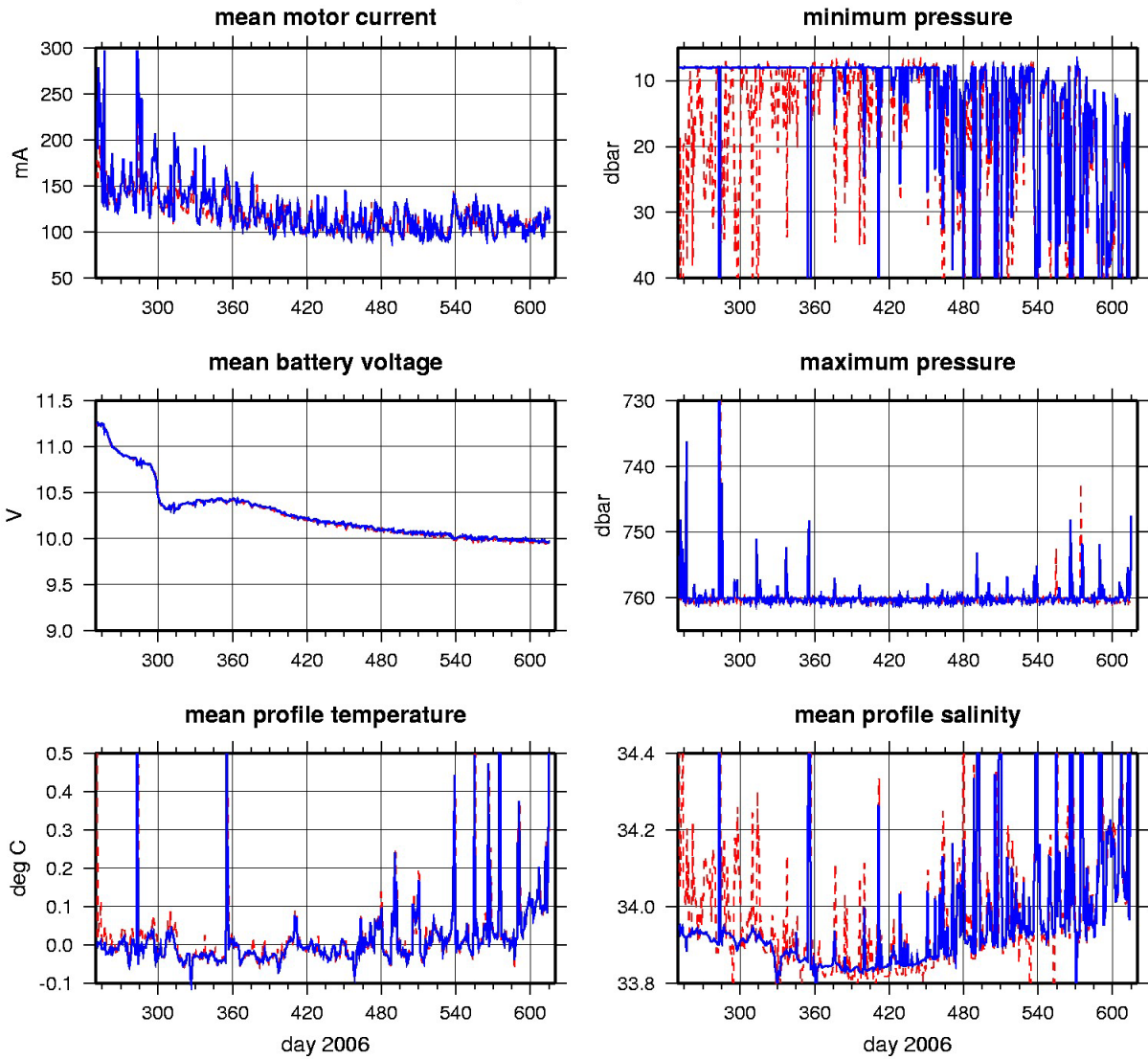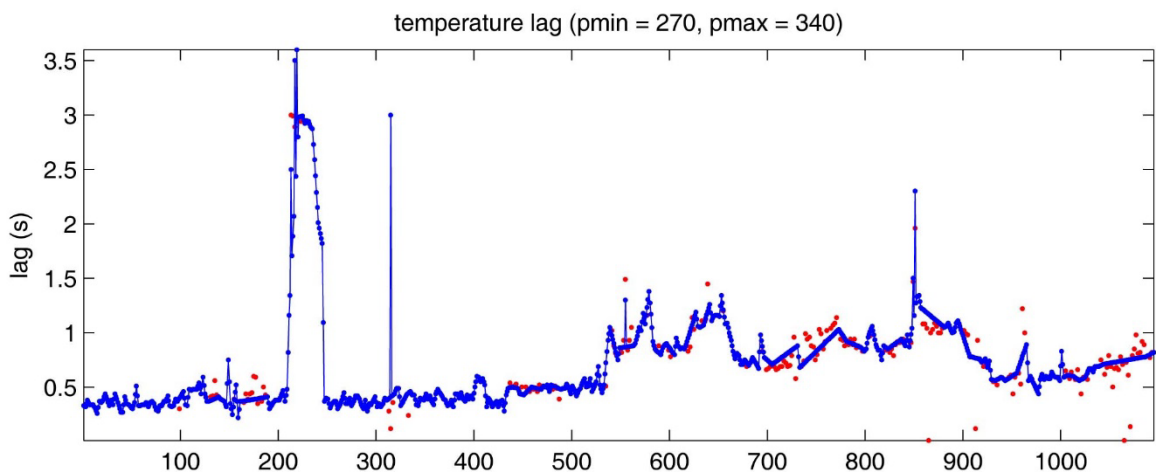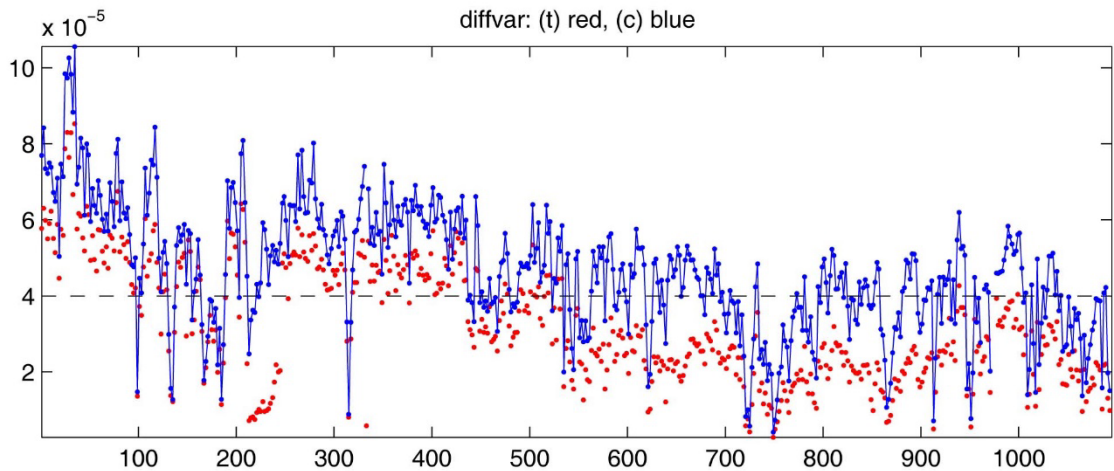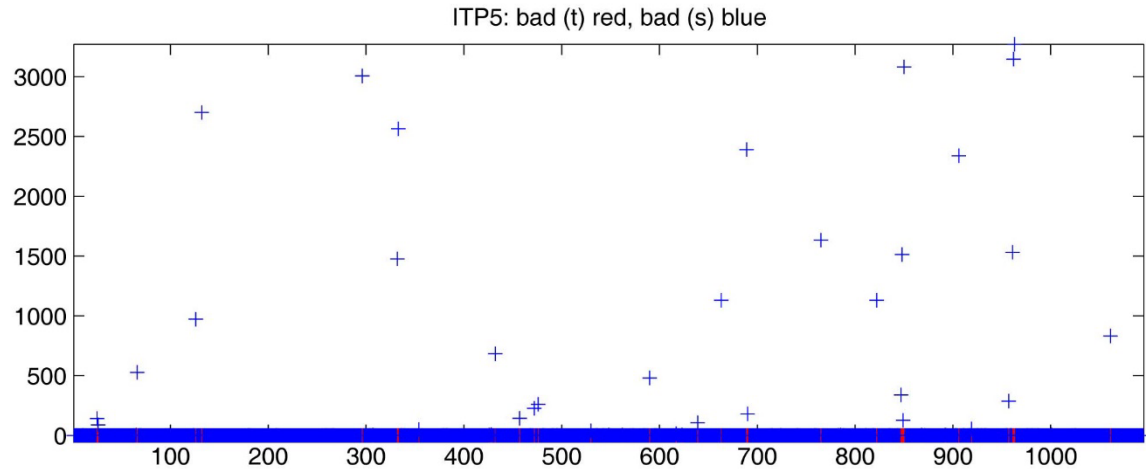format: itp5final.tar.Z or itp5final.zip

ITP5 Buoy Status (as of 2007/12/01)

drift speed

buoy temperature

battery voltage

day 2006
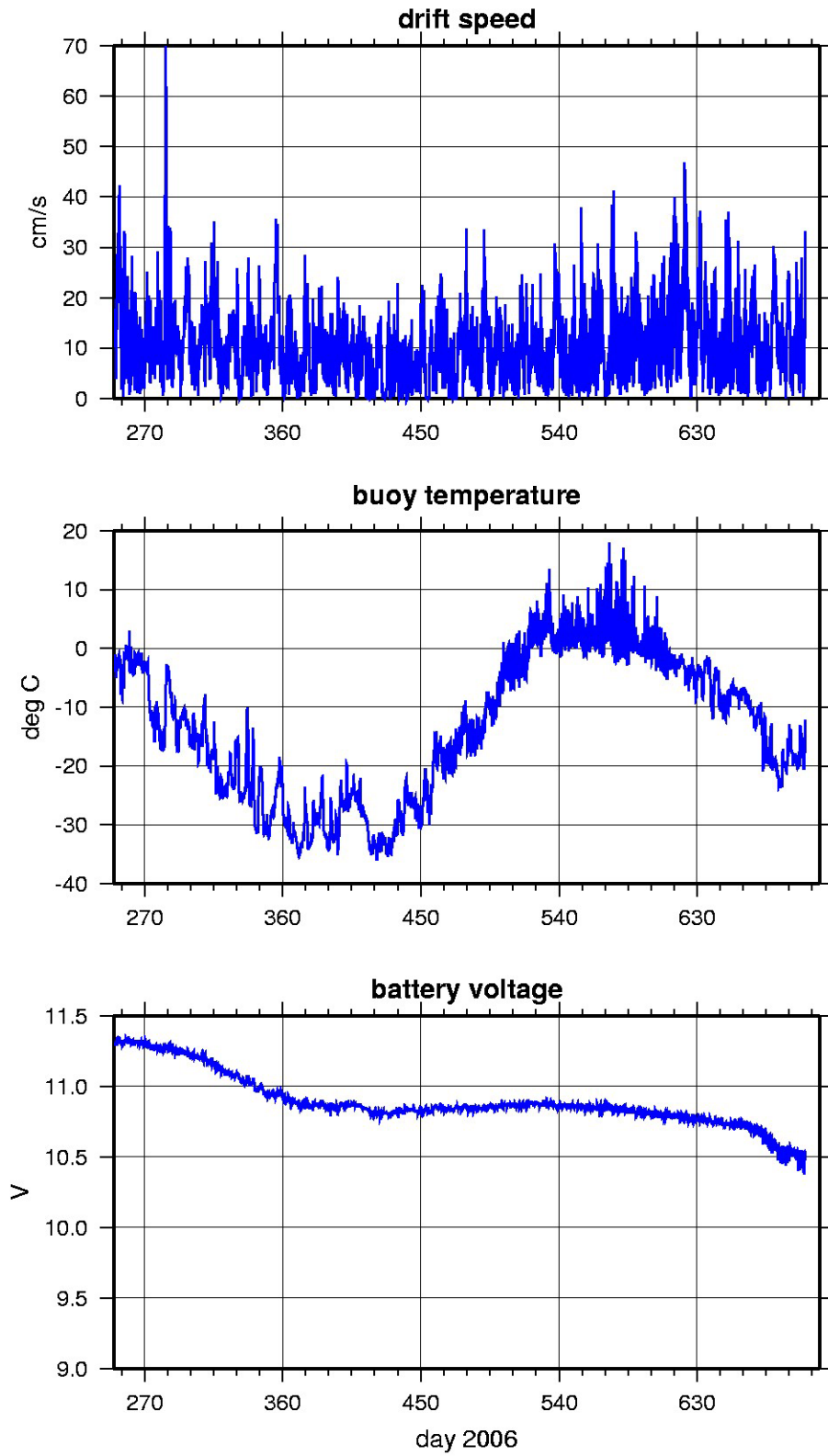
ITP surface buoy status

ITP5 Profiler Status (up to profile 1095)

up solid, down dashed

mean motor current

minimum pressure

mean battery voltage

maximum pressure

mean profile temperature

mean profile salinity

ITP profiler engineering data

Top: number of bad points removed, Middle: variance of vertical difference of temperature and salinity in step region for up-going profiles, Bottom: temperature lag.
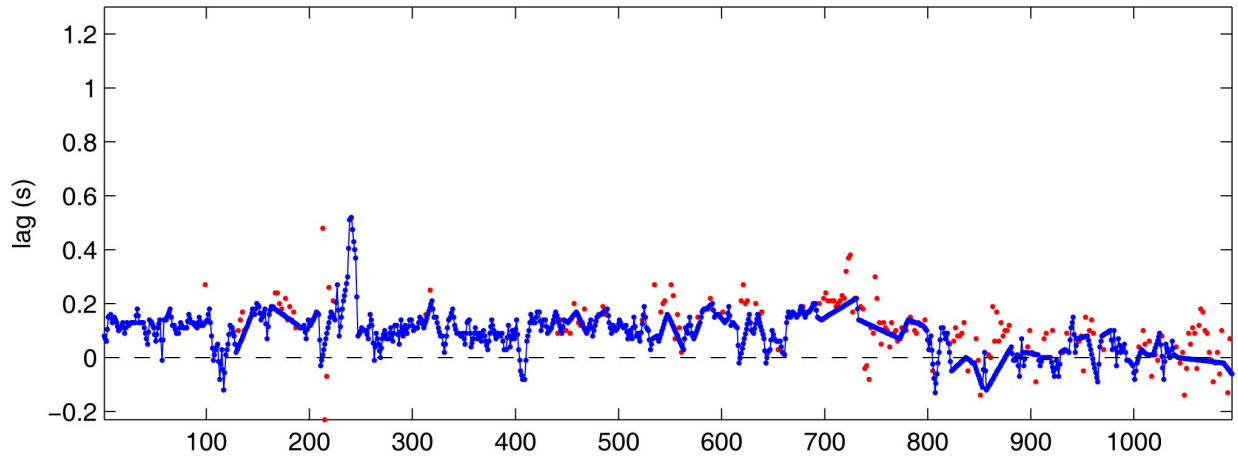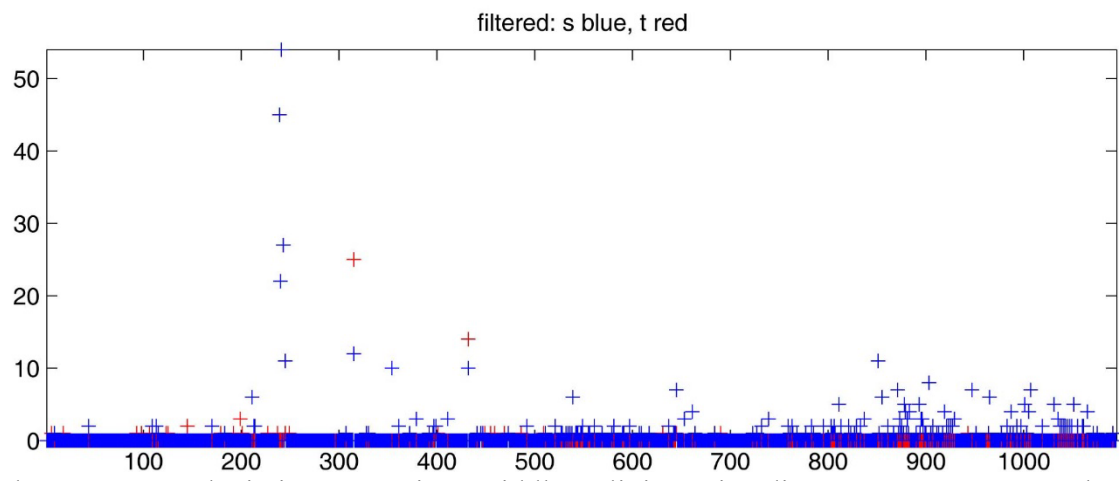
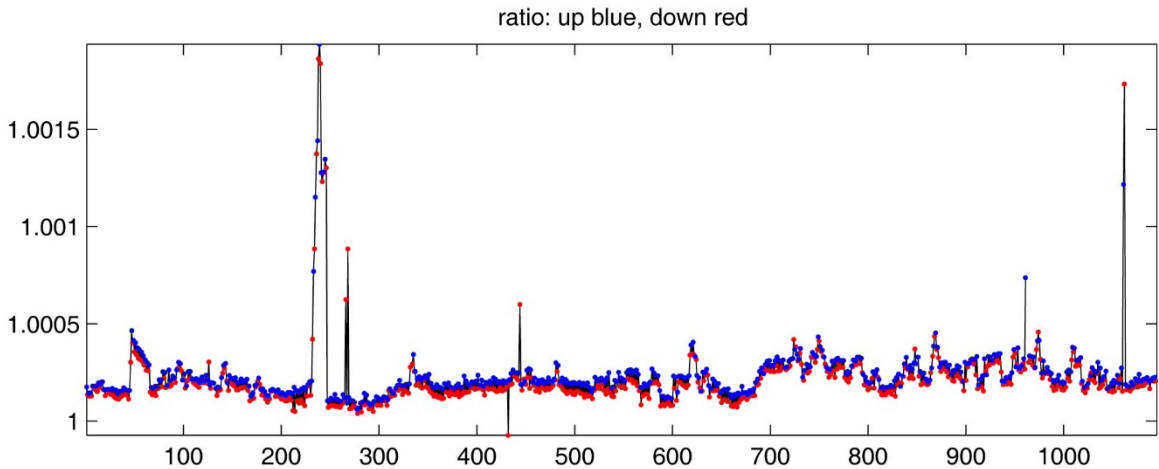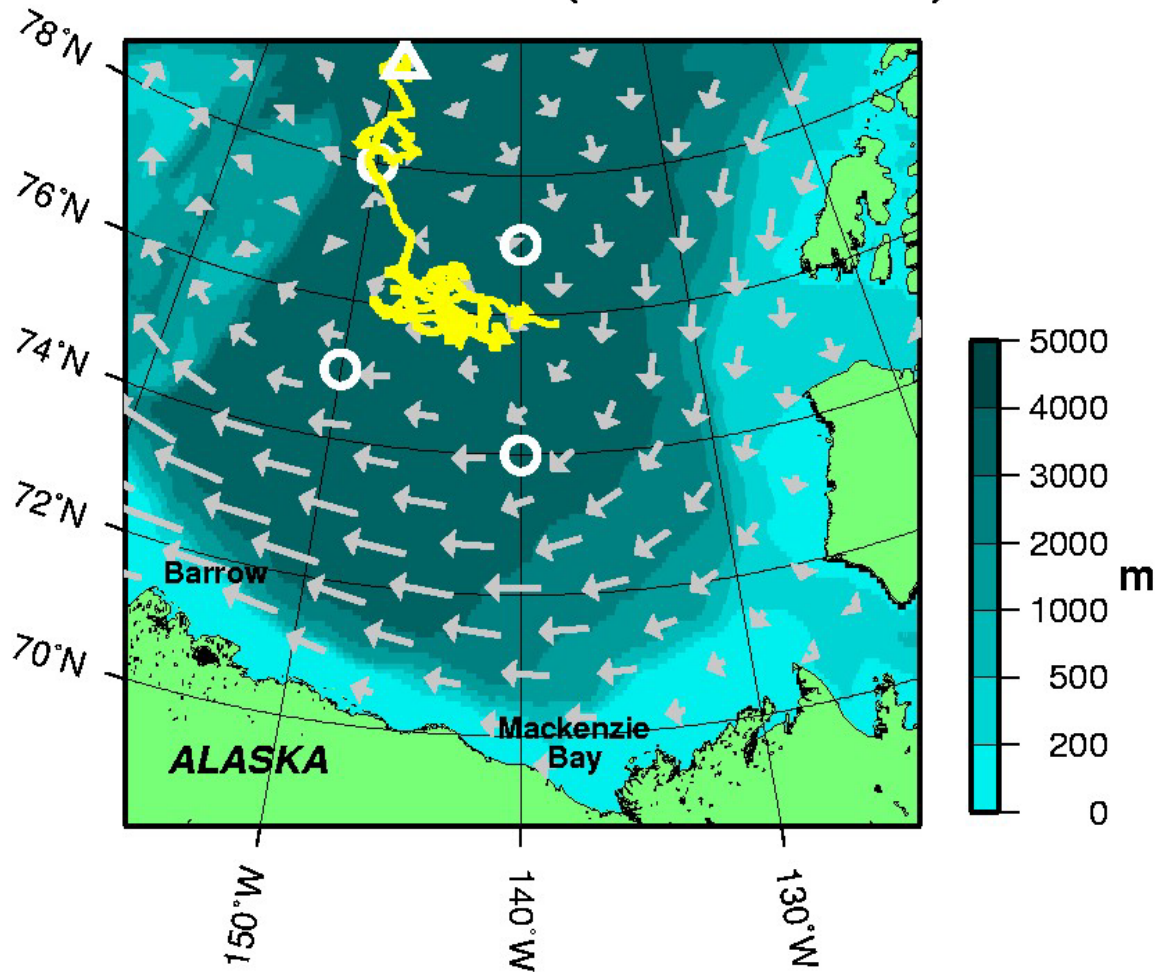Top: conductivity lag, Middle: conductivity thermal mass amplitude correction, Bottom: conductivity thermal mass lag correction.
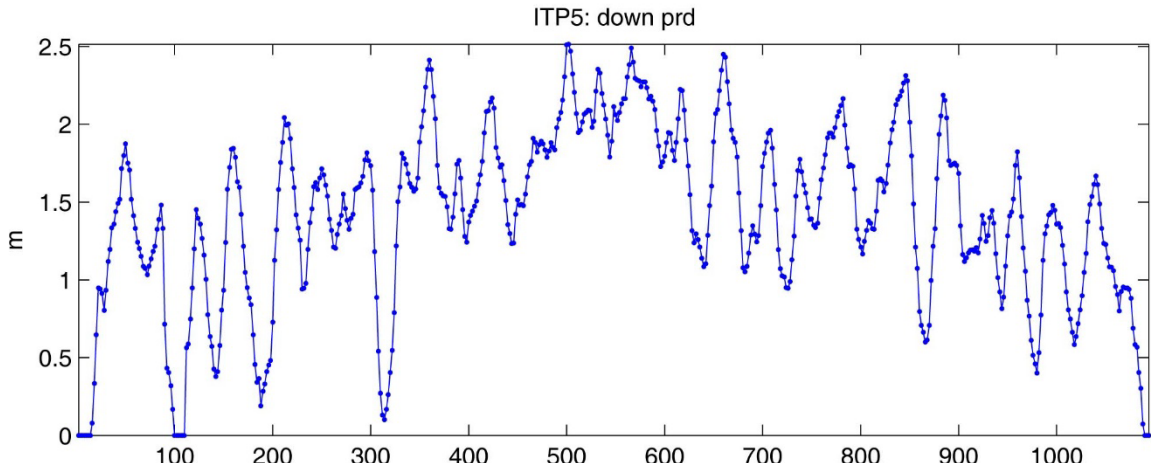
Top: down pressure deviation correction, Middle: salinity ratio adjustment, Bottom: Number of filtered spikes.
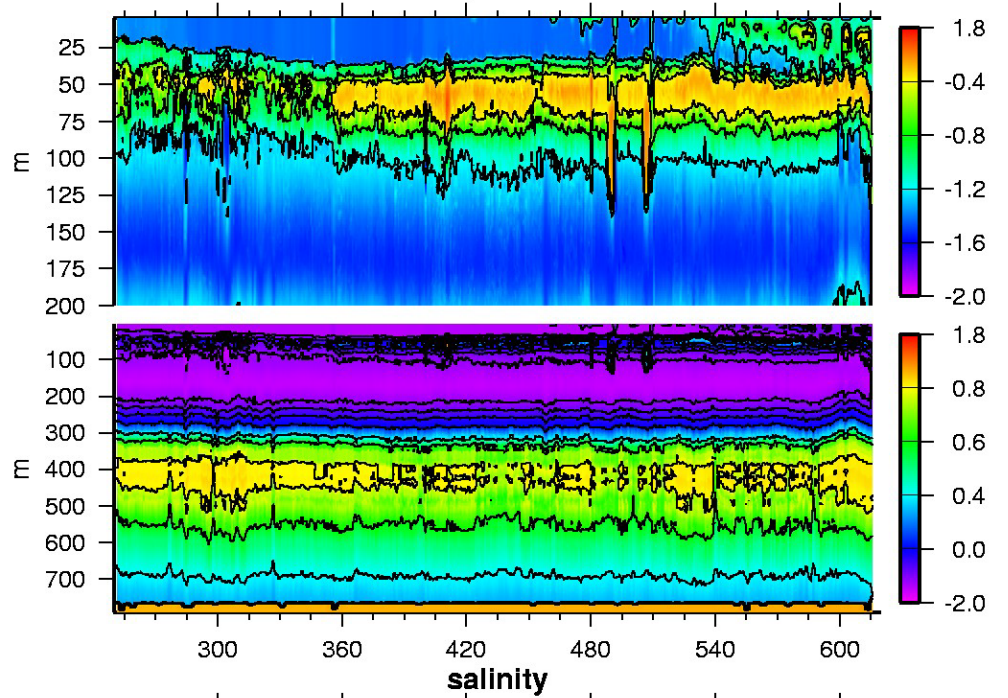
ITP5 Drift Track (as of 2007/12/01)

ITP drift (yellow line) and latest location (triangle),
BGOS moorings (white circles) and annual ice drift from
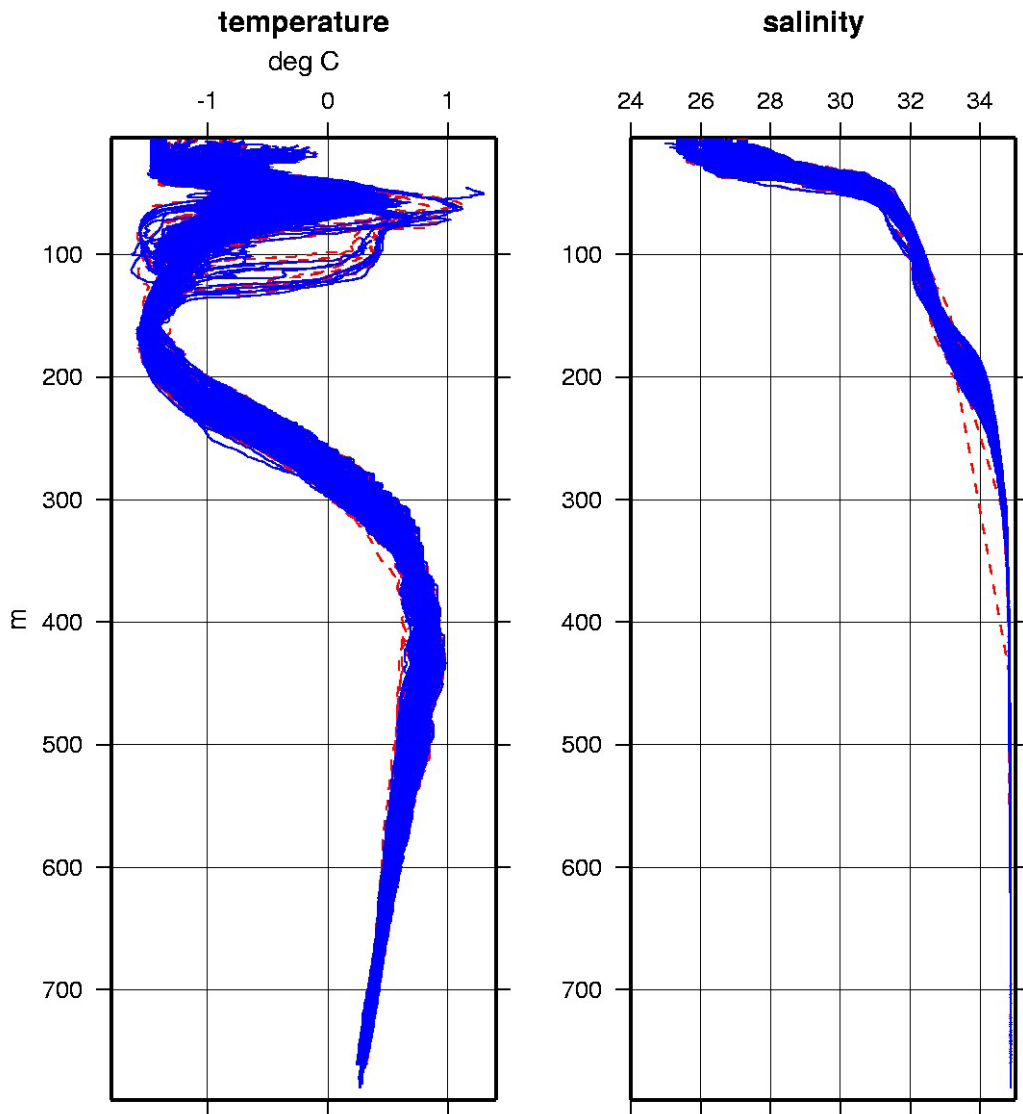IABP (grey vectors) on IBCAO bathymetry (shading).

Plot of buoy locations.

ITP5 Up Profile Contours (to profile 1094)

temperature

salinity

day 2006
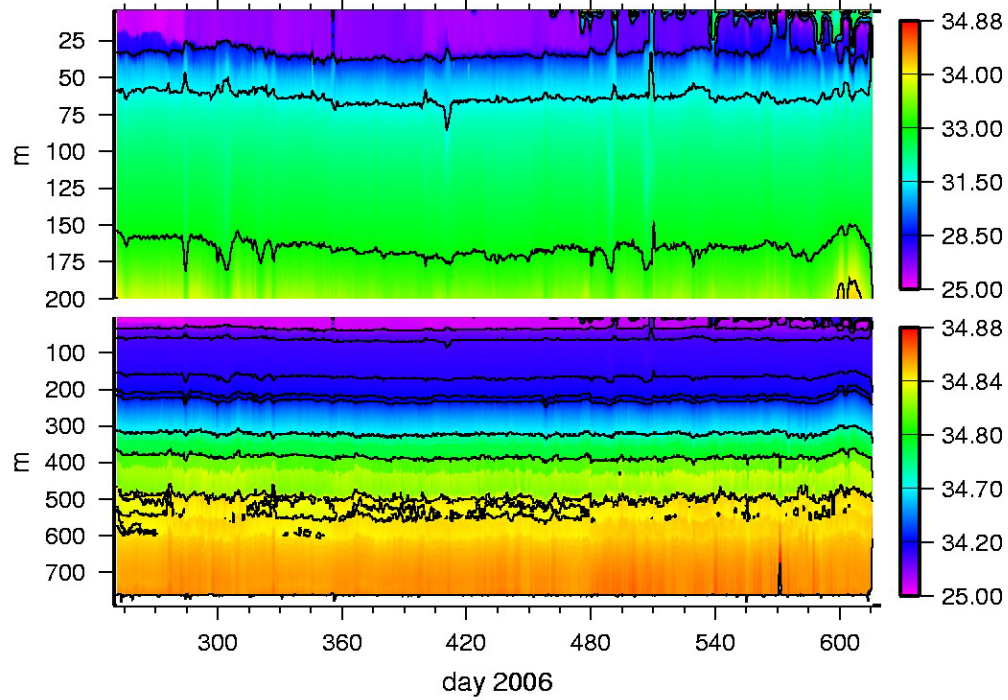
ITP 5 Temperature and Salinity contours.

All ITP5 Profiles (up to profile 1094)

temperature
deg C

salinity

up solid, down dashed

Composite plot of ITP profiles.

ITP 5 after deployment on September 7, 2006, as the field group hauls the last load of equipment to the helicopter for transport back to the CCGS Louis S. St. Laurent. Photo by Rick Krishfield.