2015 Drifter Developments

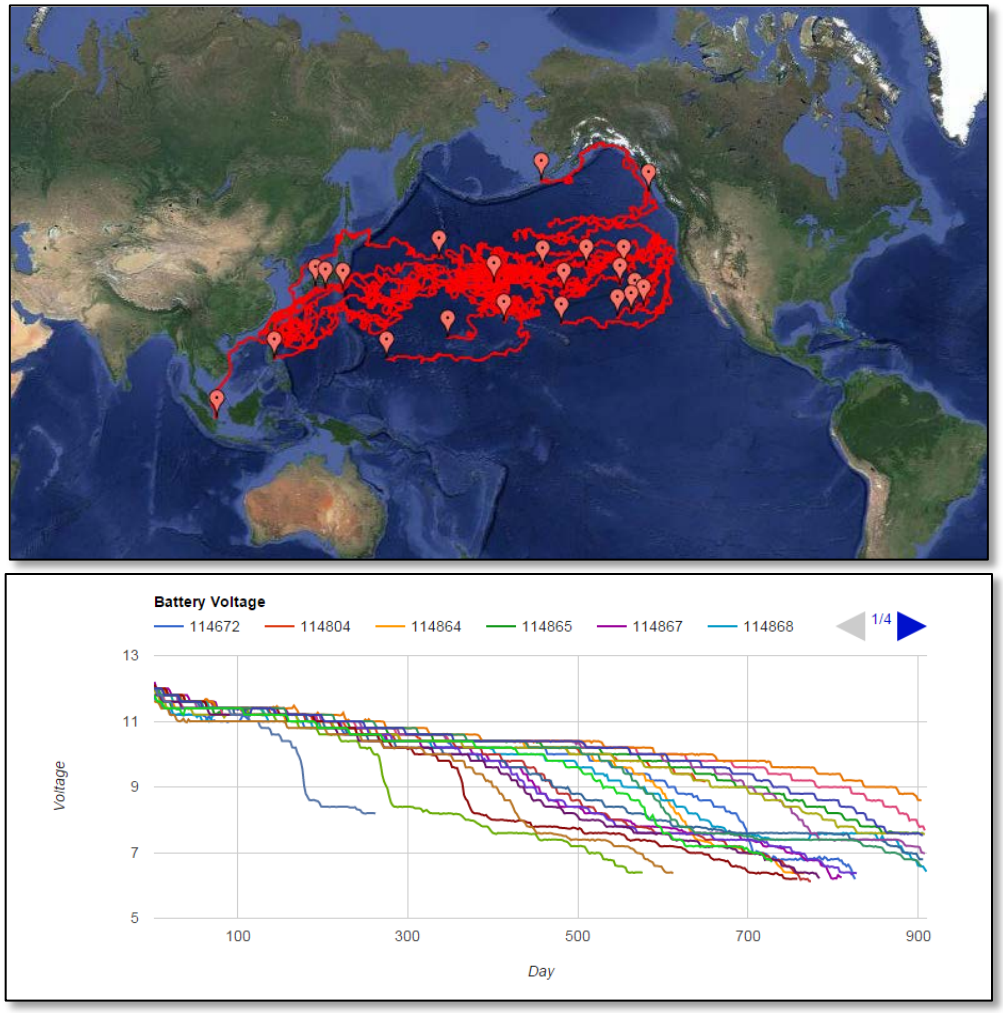
at

Scripps Institution of Oceanography

By Lance Braasch and Luca Centurioni

Batteries and Diagnostics

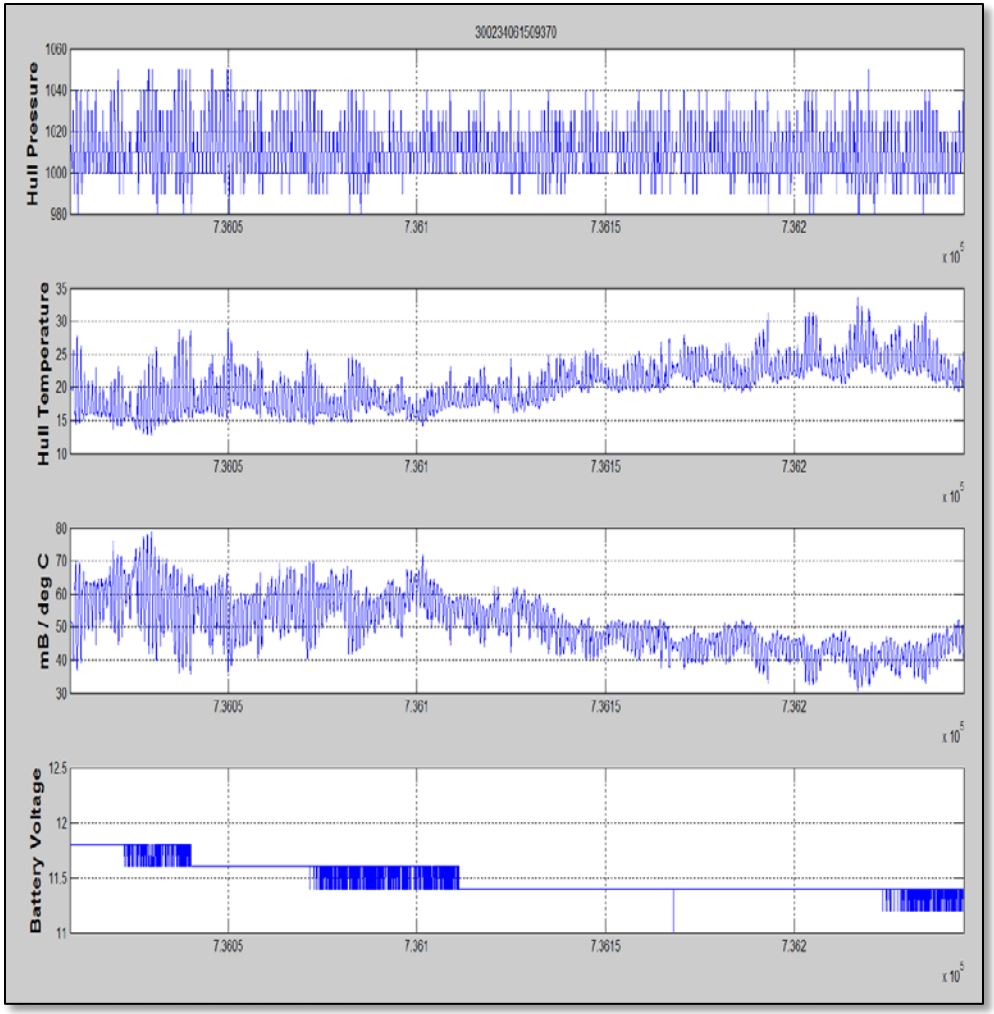
- R/V Revelle Pilot array
  - Hardware
    - SVP configuration
    - Single 12VDC 56Ah ruggedized alkaline battery pack
    - PMT in Argos-3 Random mode
  - Deployment
    - 29 deployed
    - 7 grounded
    - 9 currently transmitting
  - Statistics
    - Mean: **687** days
    - Median: **784** days
    - Max: **924** days (and counting…)



R/V Revelle drifter tracks and battery voltage of non-grounded platforms

Batteries and Diagnostics

- In-hull diagnostic sensors
  - Relative humidity
  - Pressure
  - Temperature
- Pressure / Temperature (mB / C) should remain constant once sealed unless battery begins to outgas
- Results pending due to small sample size
  - Flat
  - Climbing
  - Climbing/Falling*

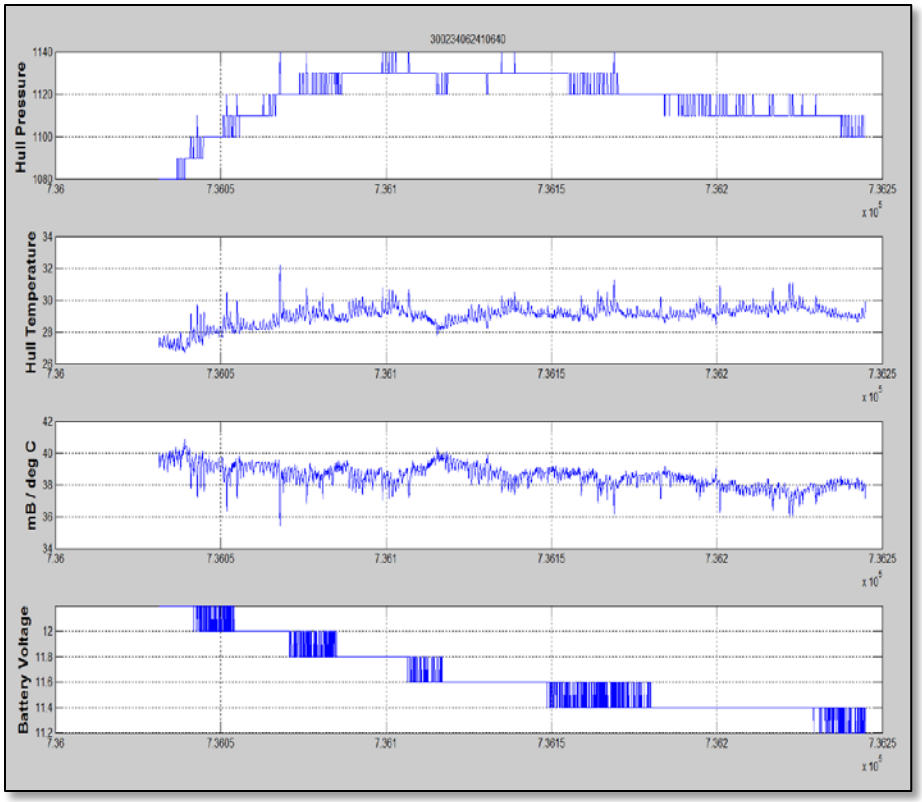


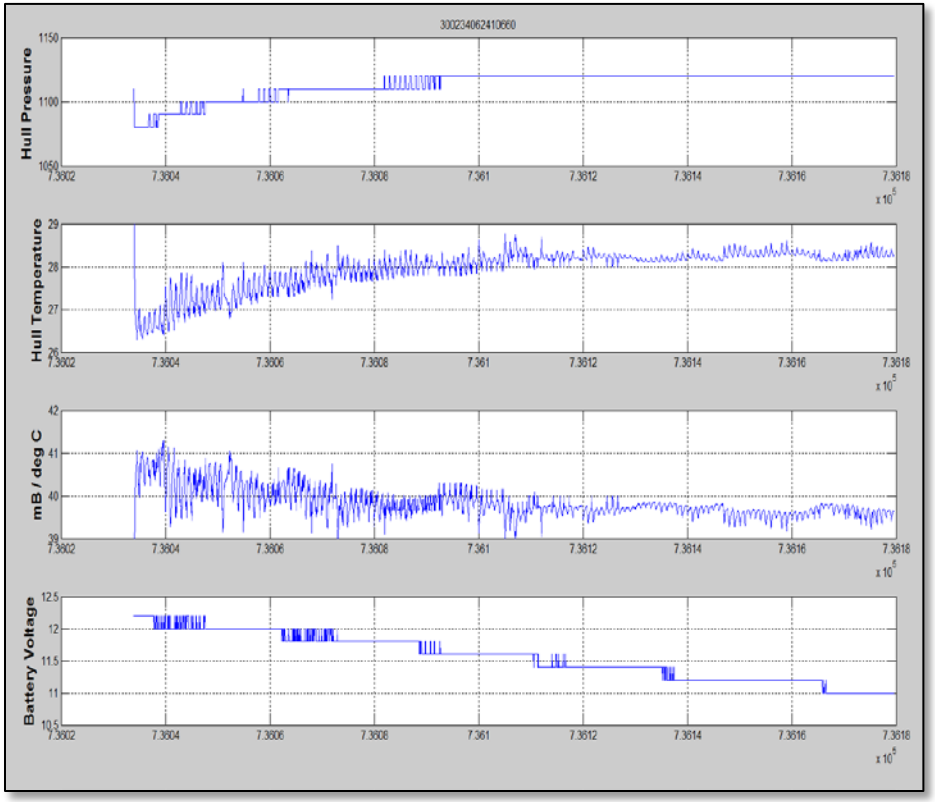
Mooring at SIO Pier, 220 days

Batteries and Diagnostics

Steady internal pressure with respect to hull temperature

Healthy Batteries



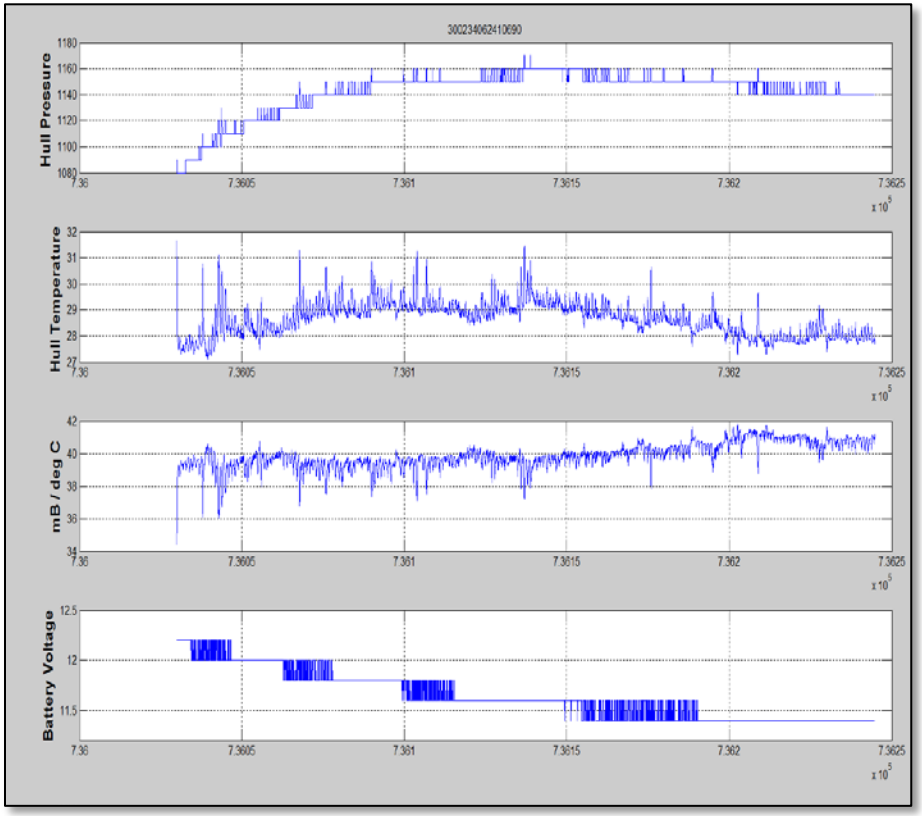


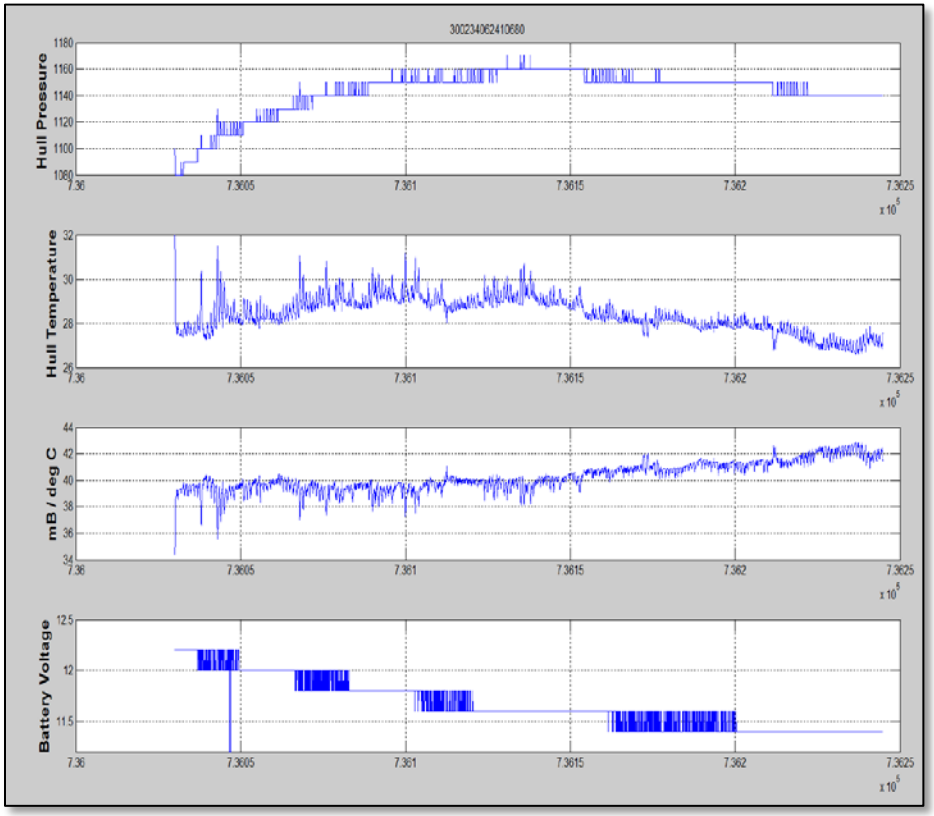
Satellite ID: 300234062410640 and 300234062410660, 150 days

Batteries and Diagnostics

Slow climbing internal pressure with respect to hull temperature

Questionable Batteries



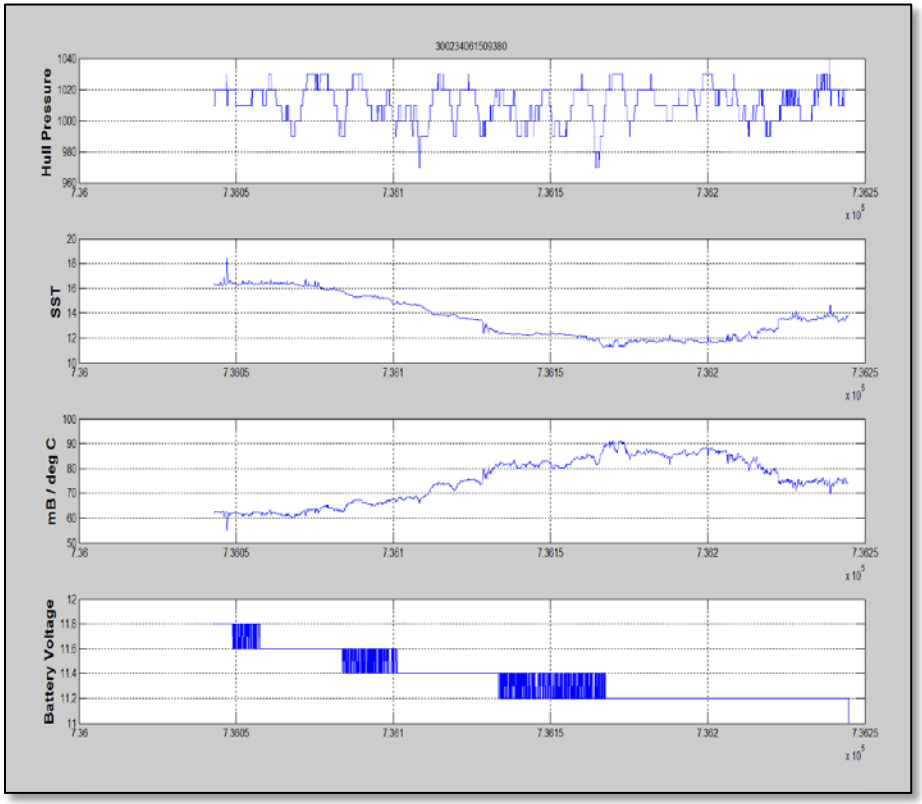


Satellite ID: 300234062410680 and 300234062410690, 220 days

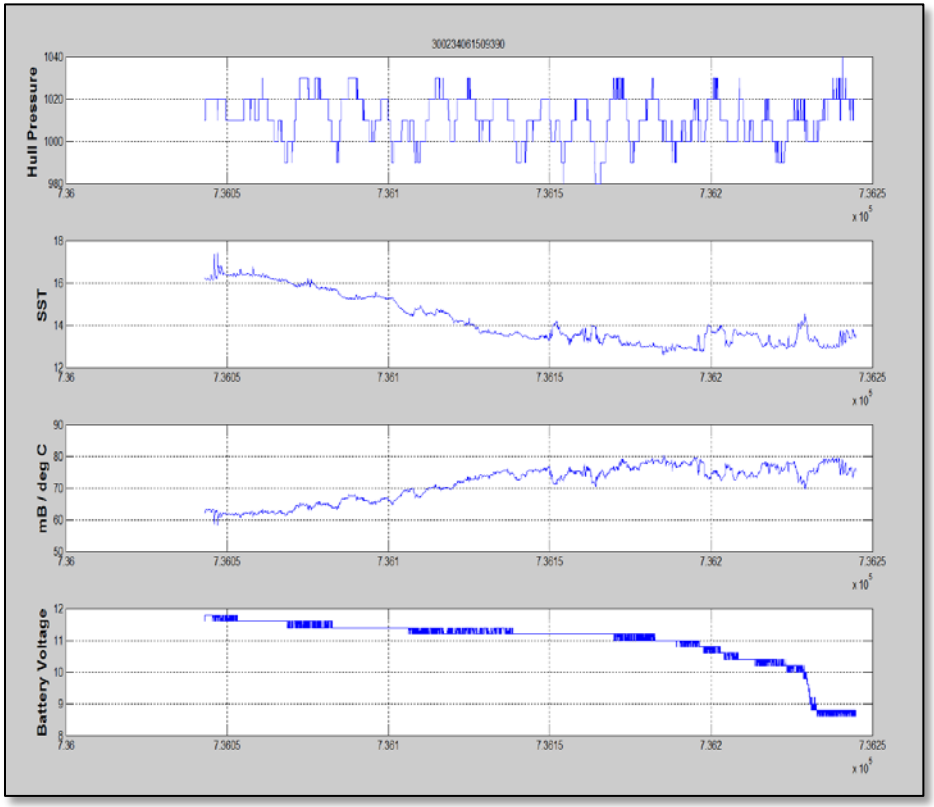
Batteries and Diagnostics

Rapid climbing internal pressure with respect to SST*

Inconclusive



Failed Battery



*Hull Temp not reported. SST used for mB/C curve

Satellite ID: 300234061509380 and 300234061509390, 220 days

SIO-SST vs. SBE-SST

- SIO manufactured SVP drifters with Seabird SBE-37 for measuring surface salinity for the **ASIRI** project
  - SBE37 thermistor located **24cm deeper** than SIO-SST
  - Sampled every 5 minutes for ~1 month, transmitted in real-time over Iridium SBD enable temporal comparisons.
  - Tight deployment spacing enable spatial comparisons
  - Standard calibration routines and GDP specification hardware
  - 33 drifters for in-situ comparisons

SIO-SST vs. SBE-SST

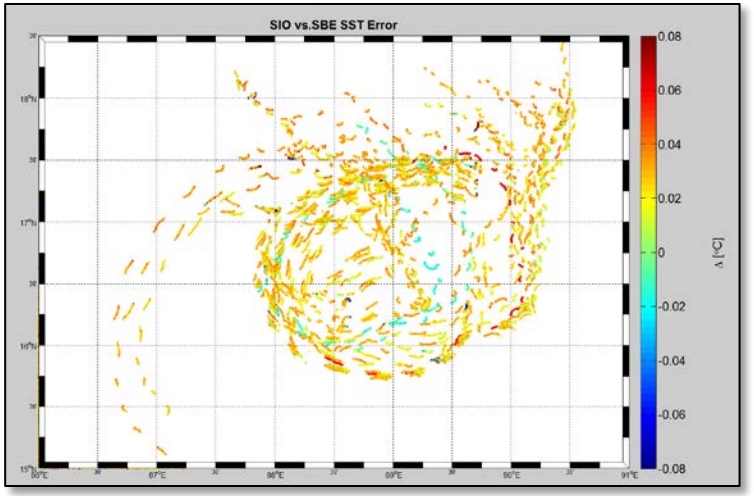
Results

- SIO SST showed average warm bias of ~0.025C
- Mean error within 0.05C

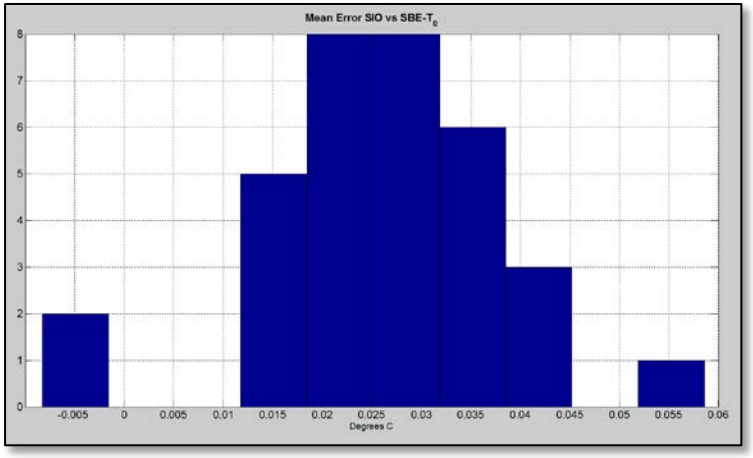
Conclusions

- 0.05C does not require extensive calibration procedures
- 0.05C does not require proprietary circuits or Analog-to-digital converters
- 0.05C thermistor + A-D converter + bridge circuit with standard calibration bath is sufficient

Demonstrates consistent agreement within expected error range (0.05C) of SIO sensor



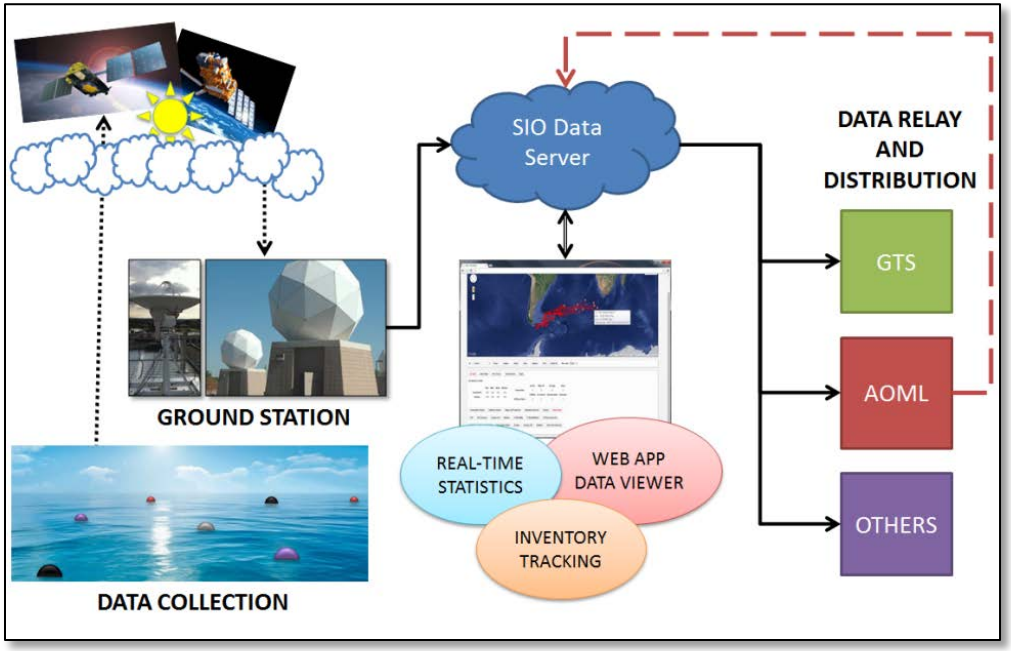
Drifter position w.r.t. SST error. *V. Hormann, 2015*



SST mean error SBE-SST vs. SIO-SST distribution

Buoy Processing Server and GTS

- Transition to **DoD** Iridium gateway in progress
- Processing over **18,000** Iridium SBD messages per day
- Providing GTS insertion for over **150** platforms (BUFR)
- Relay of real-time data for collaborating partners and scientists
- Routines updated for both Iridium and Argos-3 processing chains
- Server racks upgraded in 2015



Roadmap

- What's next?
  - Evaluate additional sensor payloads
    - Classic configurations
    - Miniaturized configurations
  - Wave Spectra Analysis
    - Refine GPS based engine
    - IMU based engine
    - Field validation studies

More sensors, more data!