A New Generation of Drifting buoys: SVP-BRST

Surface Velocity Platform drifter with Barometer and Reference Sensor for Temperature

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Overview:

- New radiometer the 'Sea and Land Surface Temperature Radiometer' (SLSTR) on Copernicus Sentinel-3 A/B require high quality Fiducial Reference Measurement (FRM) data for validation.
- New Copernicus-funded drifting buoy design to include a high accuracy and high frequency (1Hz) sampling capacity, with additional digital probe and near-surface water pressure sensor.
- FRM measurements to be linked to SI traceability, and include documentation of the SST accuracy / uncertainties and metadata.
- New design complies with DBCP SVP standards, with a new array of 100+ buoys planned.
- 6 Partners: CLS, nke instrumentation, Meteo-France, SHOM, BSH, JCOMMOPS.
- Project to run until the end of 2021.

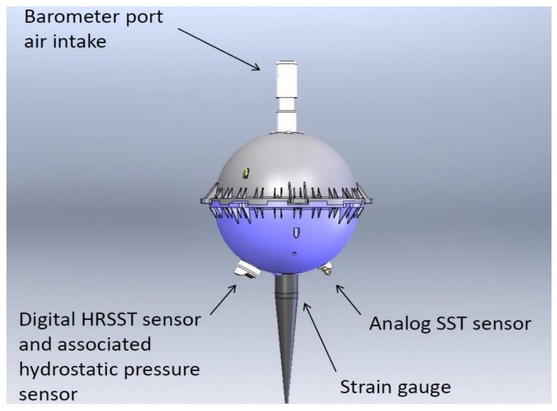
The Sentinel-3 Satellite

Design & Assembly::

- Based on nke instrumentation SVP-40 drifter
- Sensor array:
  - Analog Temperature sensor
  - Strain Gauge
  - Vaisala PTB110 Barometer
  - HR Temperature & hydrostatic pressure sensor
- Iridium 9602 transceiver with Maxtena antenna for communication
- GNSS module with positioning error

-2 alkaline batteries provide power for at least 18 months

- Sensors initial calibration in nke testing facility



Schematic of the SVP-BRST Buoy

The 2 prototypes prior to shipping

User set up through PC with Bluetooth

2 prototypes built and tested extensively in a quarry and out at sea.

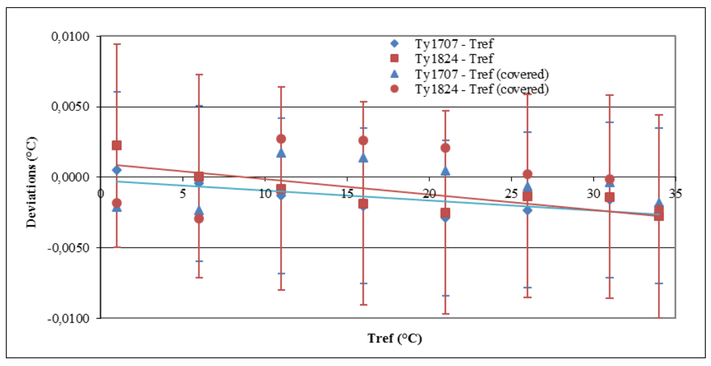
Metrology:

- Performed by the SHOM
- Dual Step approach:
  - calibration of temperature sensors
  - verification of sensors within the buoy

The 2 prototypes in the Metrology Lab

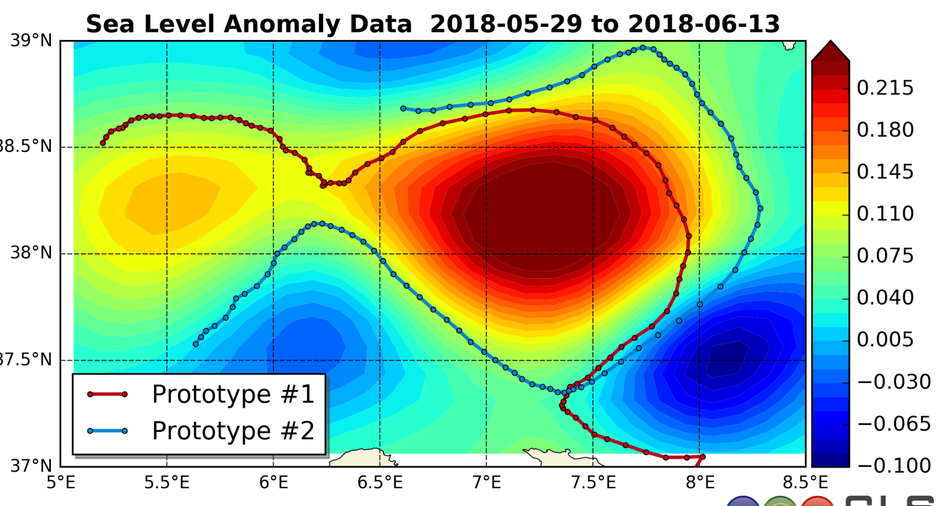
- High Resolution Sensor and Analog Sensor calibrated with SBE35 reference thermometer regularly checked in triple point of water and the fusion point of gallium cells
- Response time of HRSST sensor also measured.
- In bath with SI linked instruments
- Range from 1°C to 35°C
- Verification at sea by comparison to an SB35 fixed to an MBSA

Expanded uncertainty:
-HRSST sensor: 6. mK
-SST sensor :13 mk

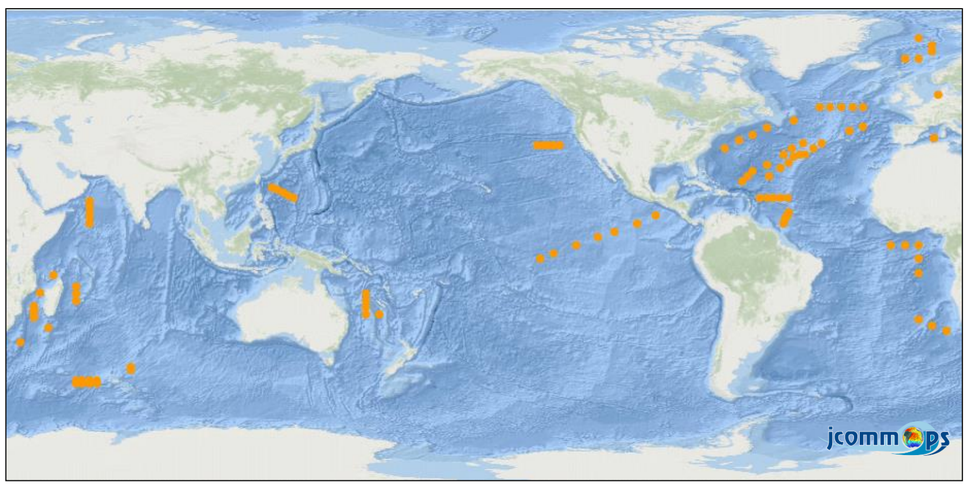


The 2 prototypes HRSST calibration curve

Deployement:



Mean Altimetry Map with 15 days of buoy tracks



Map of deployment Plan (from Jcommops Website)

The 2 buoys in the Water

- 2 buoys deployed from the Beautemps Beaupré (Shom research vessel) on 25th April 2018 after initial transmission test on deck and comparison top SBE35
- Stayed close to each other (less than 10NM) for 10 days.
- Trajectory diverge after that
- One buoy (58002) picked up off the coast Algeria on 10th June
- Buoy 58019 still at sea, data in GTS since 10/10/2018
- First Batch of 50 buoy due to be delivered by nke instrumentation at the end of the year
- Deployment plan coordinated by Meteo-France
- Deployment plan and metadata on JCOMMOPS website

Reference: Sybrandy, A. L., Niiler, P.P., Martin, C., Scuba, W., Charpentier, E., Meldrum, D.T.: Global Drifter Programme Barometer Drifter Design Reference, DBCP Rep. 4, rev. 2.2, 2009.