

Drogue Sensor Evaluation

- The GDP has been examining submergence and strain gauge for drogue detection.
- The DBCP recommended that drifter manufacturers implement tether strain for drogue detection following the success of Clearwater strain gauge drifters.

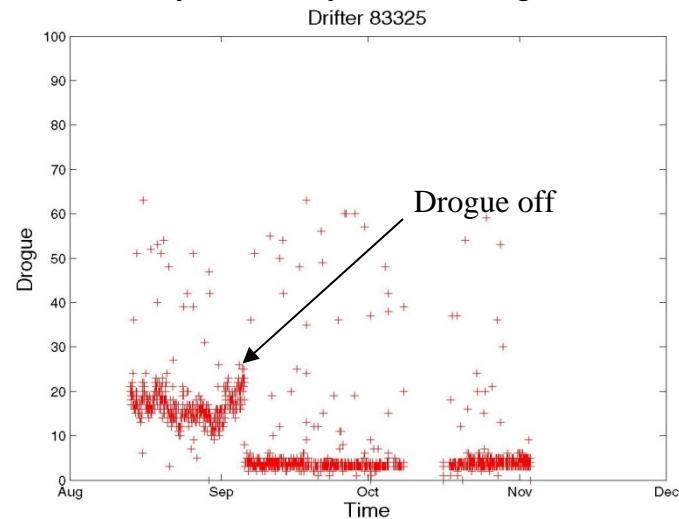
Bay of Biscay Study

- In September 2008, a pilot study was conducted in the Bay of Biscay.
- The three US manufacturers, Clearwater, Technocean and Pacific Gyre, each had tether strain implemented in their drifters and participated in the study.
- Results were mixed, indicating that challenges remain in detecting drogue presence and their ability to stay attached to the drifters for a longer period of time.

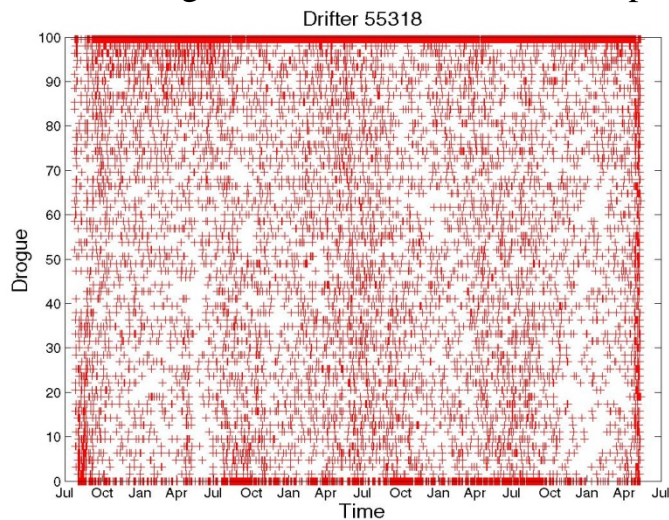
Technocean

- Submergence drogue sensors have improved dramatically over the last two years clearly indicating when drogue is off.
- Strain gauge sensors also indicate when drogue is off with a clear drop in value.
- There is a concern over how long the drogues stay attached as most lose their drogue within two months (Technocean has subsequently responded with an enhancement to the system).

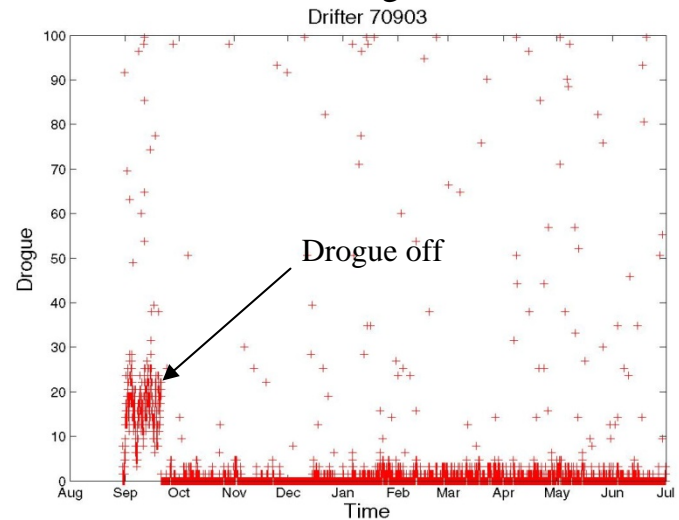
Bay of Biscay Strain Gauge



Old Submergence Sensor-difficult to interpret



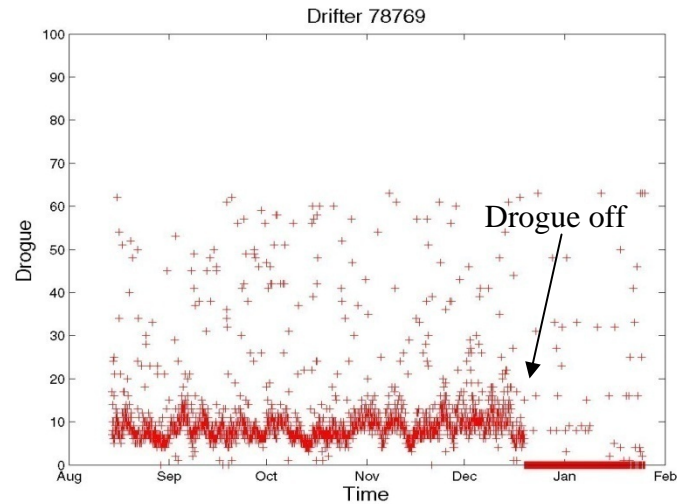
Modified Submergence Sensor



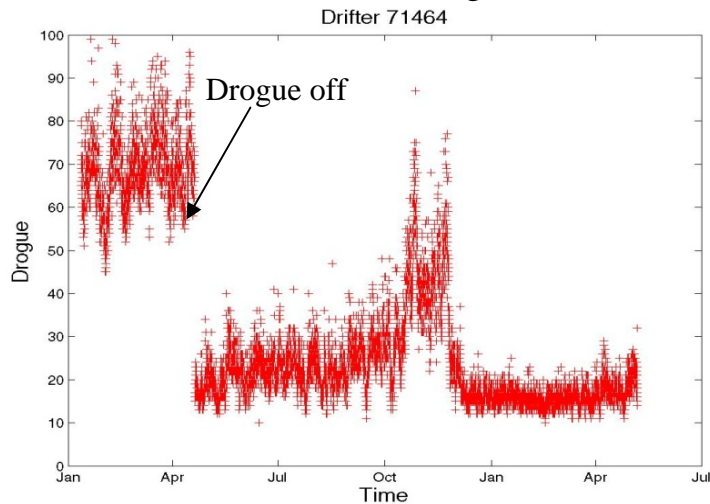
Clearwater

- Clearwater has used strain gauge drogue sensors for many years, a technique which almost always clearly shows when the drogue is lost with a sharp drop in value.
- There is also a concern with Clearwater over how long the drogues stay attached as most lose their drogue within six months.

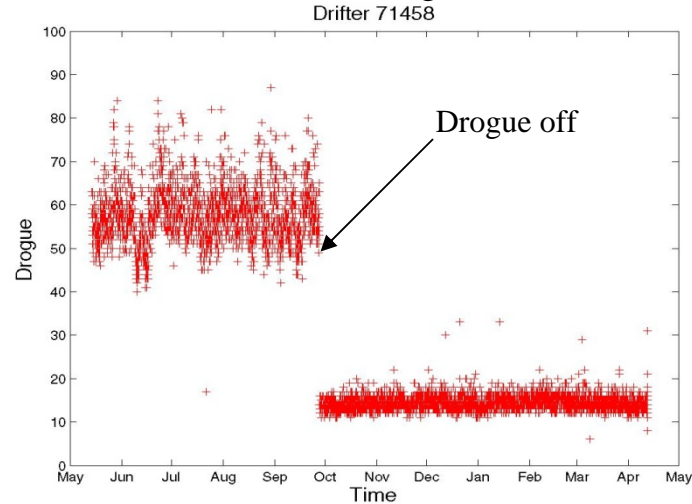
Bay of Biscay Strain Gauge



Strain Gauge



Strain Gauge

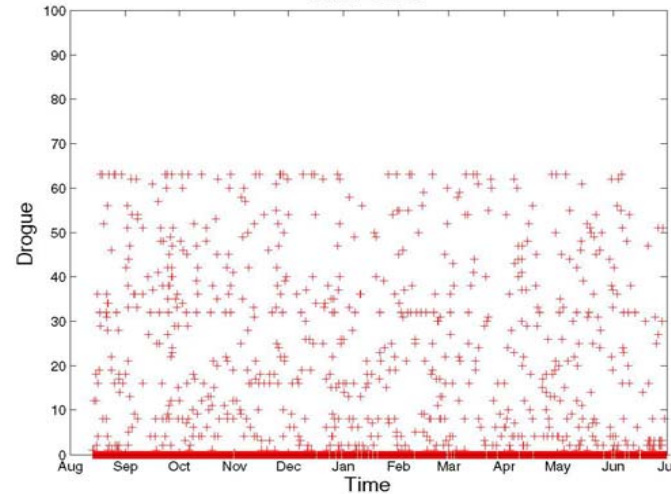


Pacific Gyre

- Pacific Gyre submergence drifters tend to peg at a high level for a long period of time.
- Submergence drogue sensors shows a clear drop in value indicating drogue off.
- Strain Gauge test drifters malfunctioned resulting in all five buoys failing to report strain value (has subsequently been addressed by Pacific Gyre).

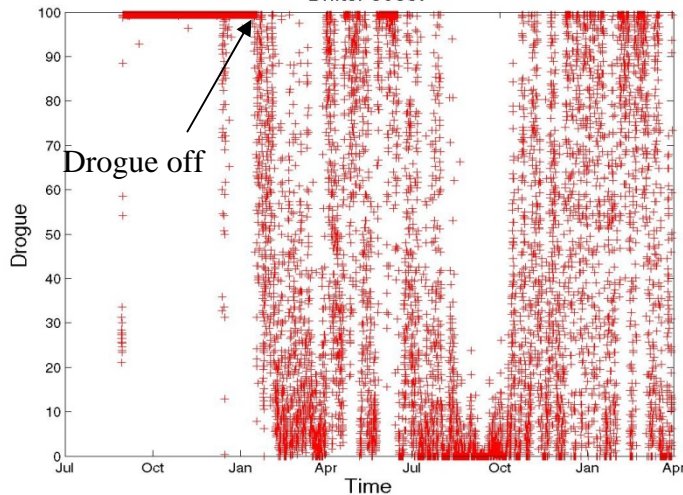
Bay of Biscay Strain Gauge

Drifter 81795



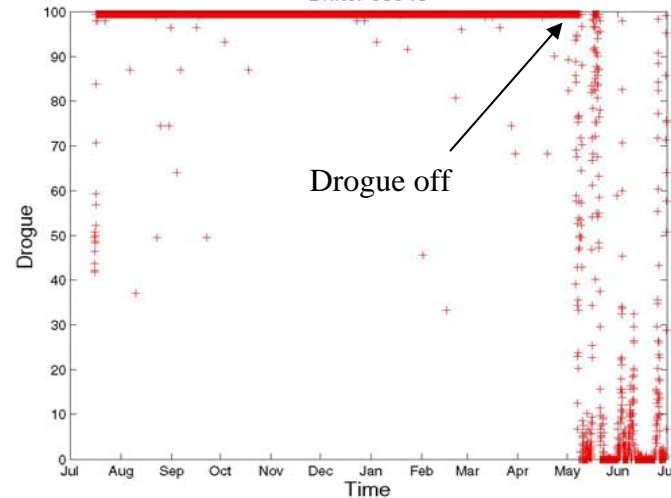
Submergence Sensor

Drifter 59887



Submergence Sensor

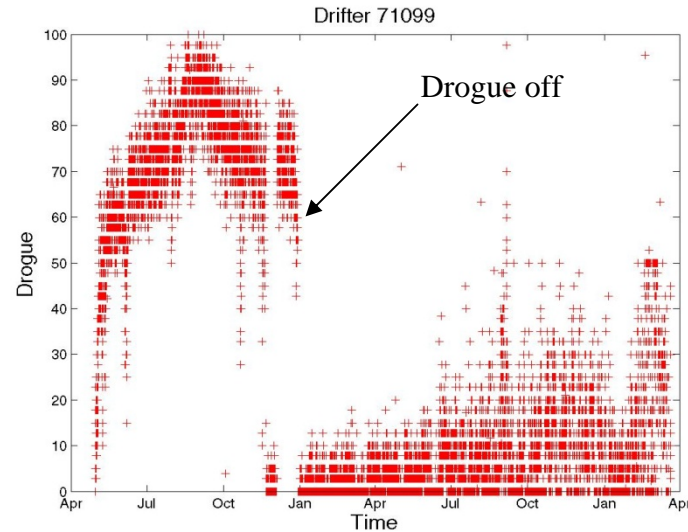
Drifter 83546



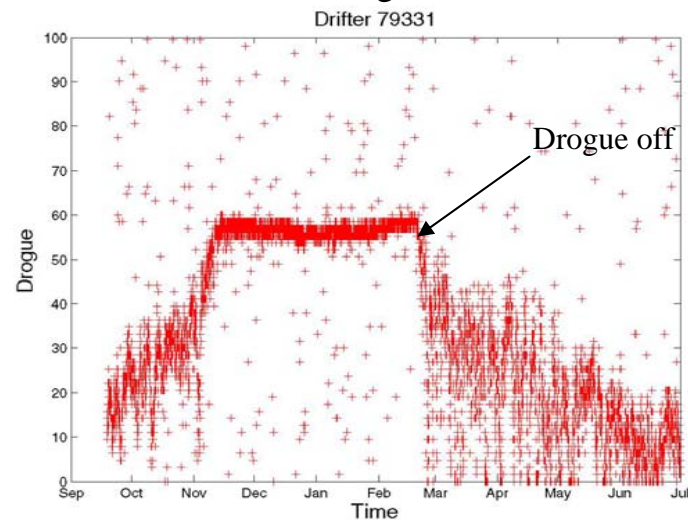
Metocean

- Metocean submergence drifters has performed well indicating drogue off with a clear drop in value.
- Metocean was not part of the Bay of Biscay study evaluating strain gauge drifters.
- Strain Gauge drifters were recently developed and deployed.

Submergence



Submergence



Conclusion

- The Clearwater and Technocean tether strain sensors performed well indicating drogue lost, but raised concerns over drogue life. The Pacific Gyre sensors malfunctioned (this has subsequently been addressed by Pacific Gyre).
- Meanwhile, over the last two years Technocean submergence sensors have improved dramatically and now appear to clearly indicate drogue loss.
- Metocean submergence sensors have also continued to perform well, clearly indicating drogue loss.
- There is concern over drogues not staying attached for more than six months for Technocean and Clearwater.
- If the Pacific Gyre submergence sensors are accurately reflecting drogue presence, then they have the longest drogue life of all manufacturers.