2014 AOML Data Buoy (ADB) Comparison Study
SVPB Clusters

Erik Valdes
Mayra Pazos

Global Drifter Program
Drifter Data Assembly Center
NOAA/AOML, Miami, FL, USA

Collaborators: **Rick Lumpkin, Shaun Dolk**

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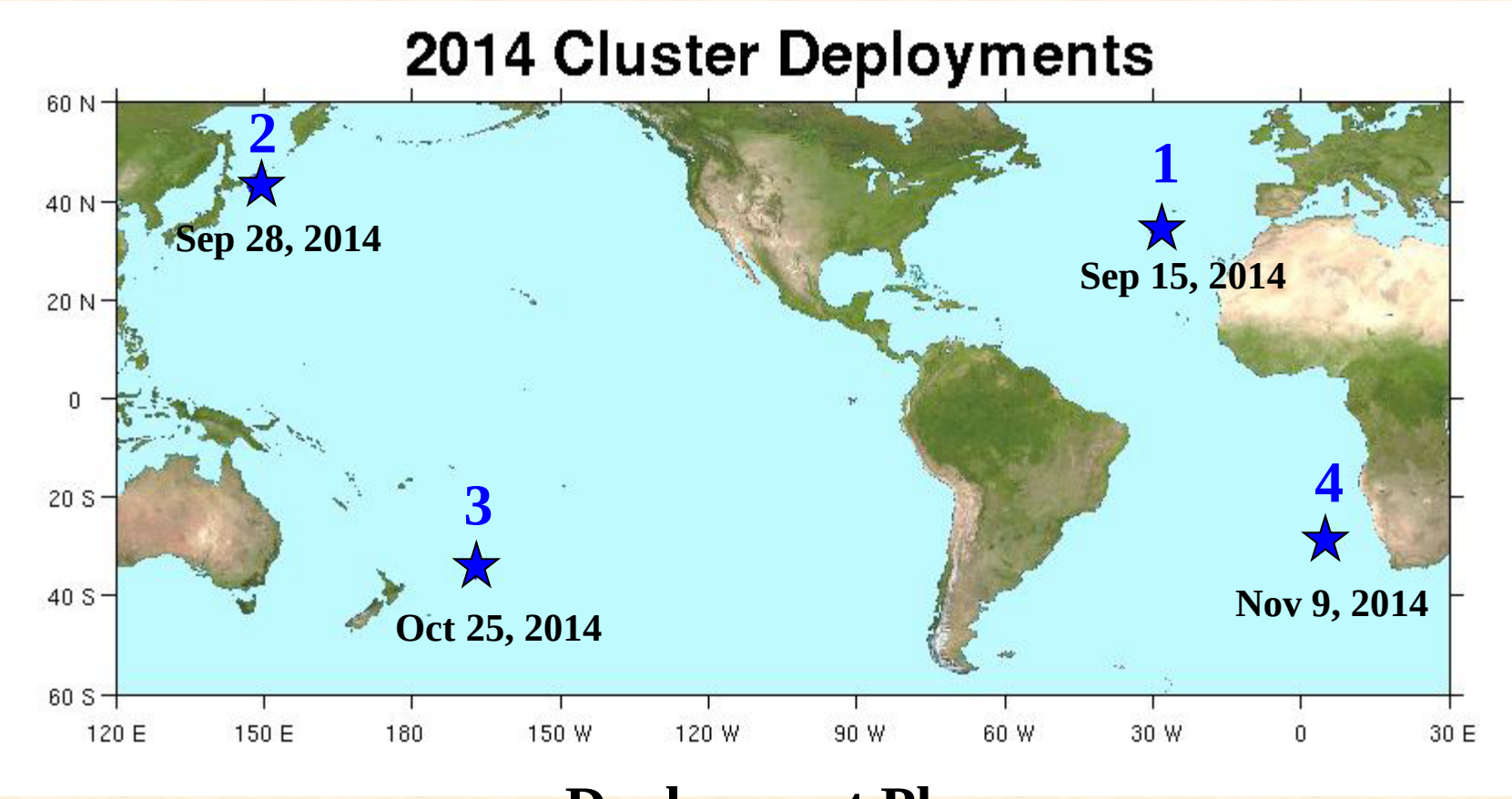
OBJECTIVES

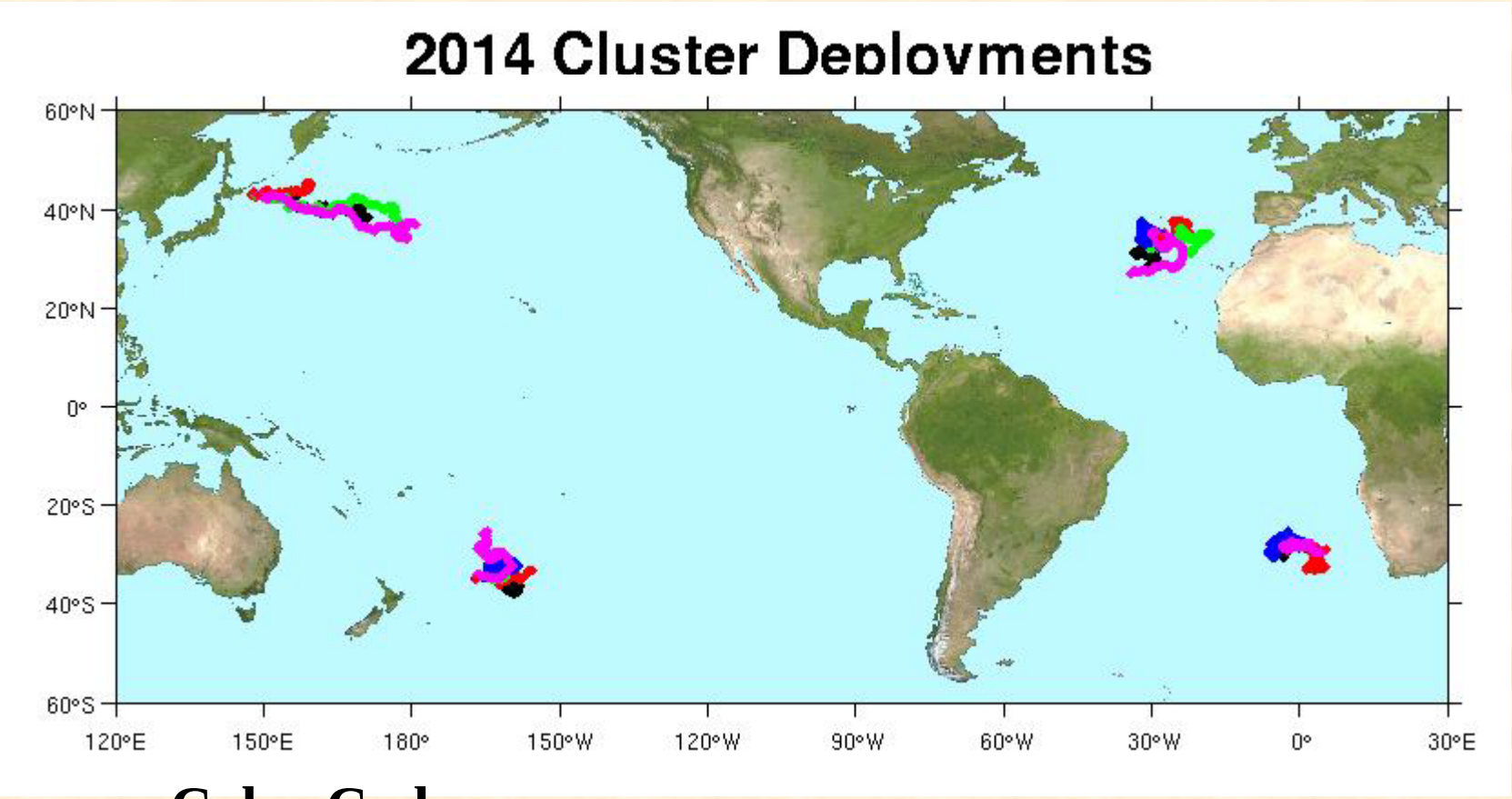
- The Global Drifter Program has been conducting comparison studies by deploying drifters from different manufacturers in clusters, at the same time and location since 2005 to evaluate their performances (2005, 2006, 2008, 2010, 2014).
- With data collected for nearly 1 year since deployment, we have evaluated how well these clusters of drifters are performing.
- Results from this study are communicated to manufacturers to address and correct problems found.



Deployment Plan:

4 clusters each of 5 SVPB Argos drifters using tether strain to indicate drogue presence, from 5 different manufacturers:

SIO, **DBi**, **Metocean**, **Pacific Gyre,** **Marlin Yug**



Color Codes:

Black = SIO

Red = DBi

Green = Metocean

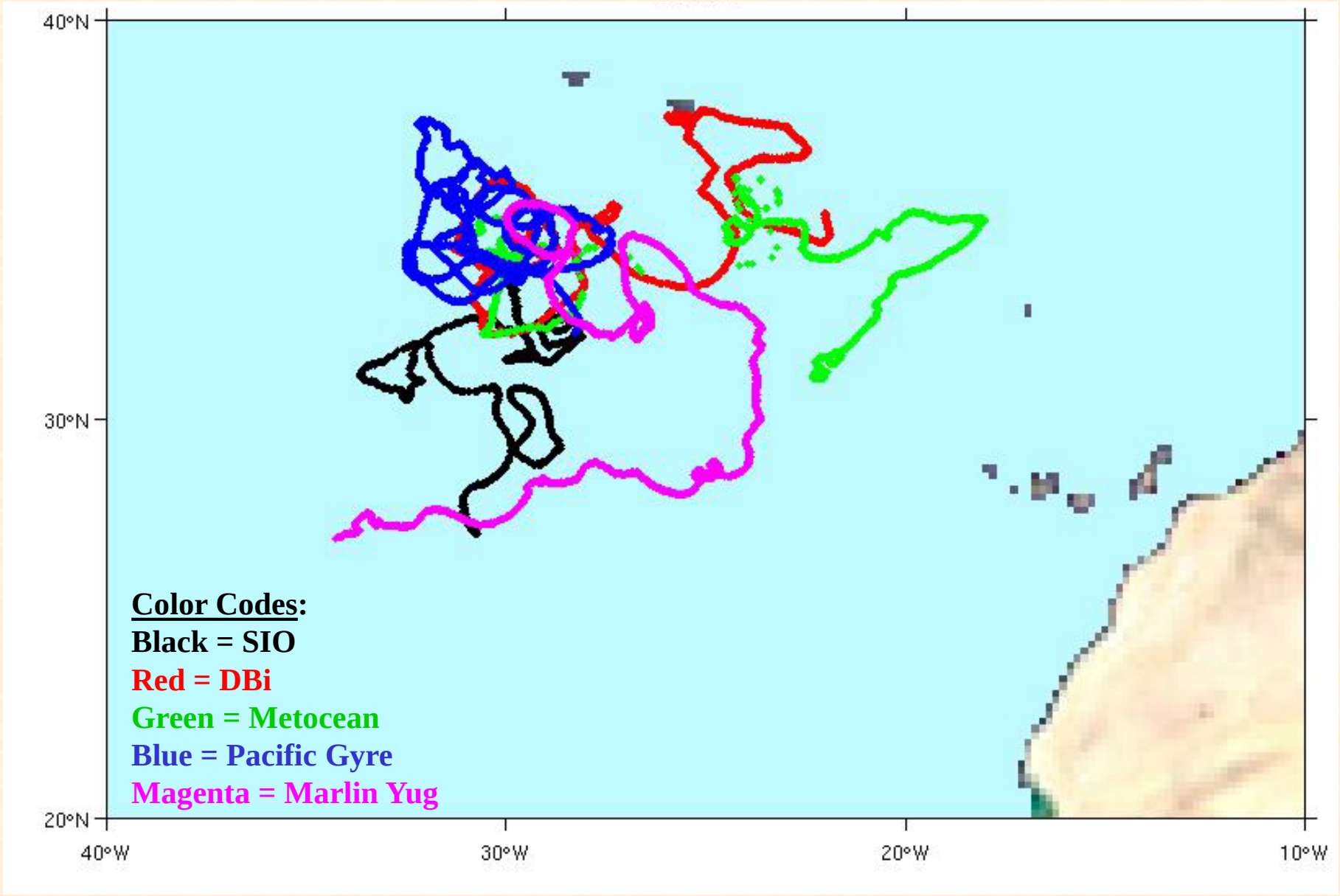
Blue = Pacific Gyre

Magenta = Marlin Yug

SIO, DBi and Pacific Gyre had Argos-3 transmitters

Metocean and Marlin Yug had Argos-2 transmitters

Cluster 1


40°N
30°N
20°N
40°W
30°W
20°W
10°W
Color Codes:
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Green = Metocean
Blue = Pacific Gyre
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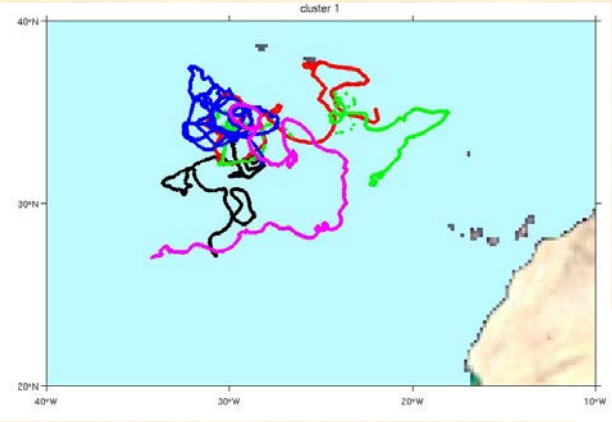

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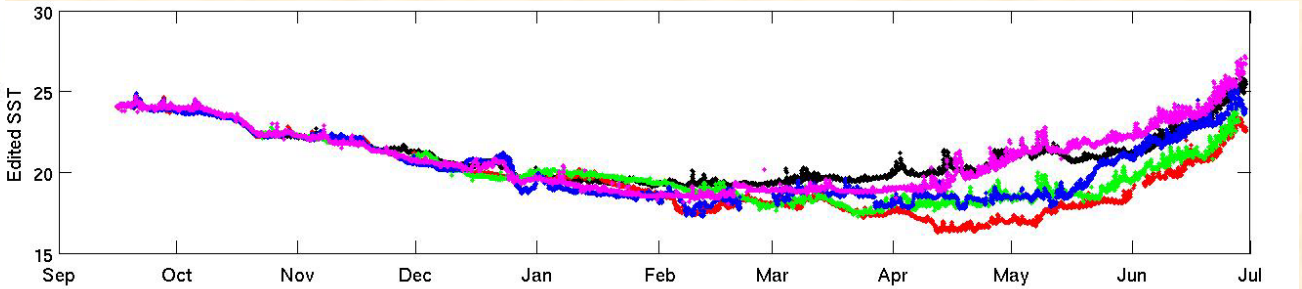
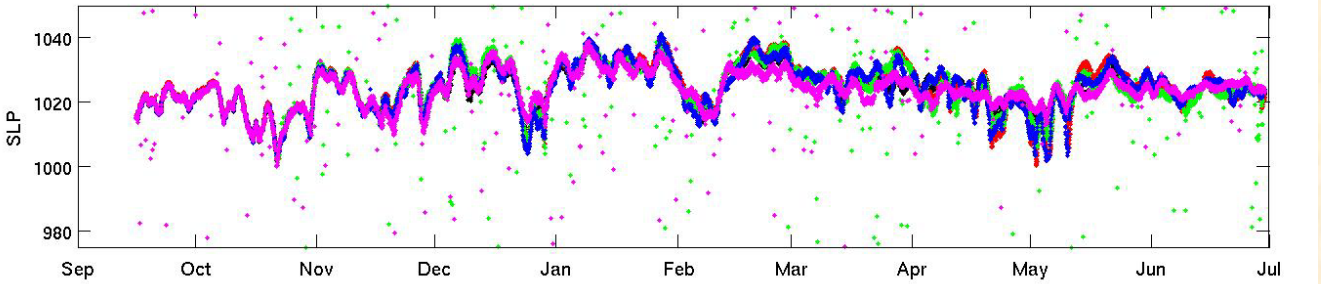
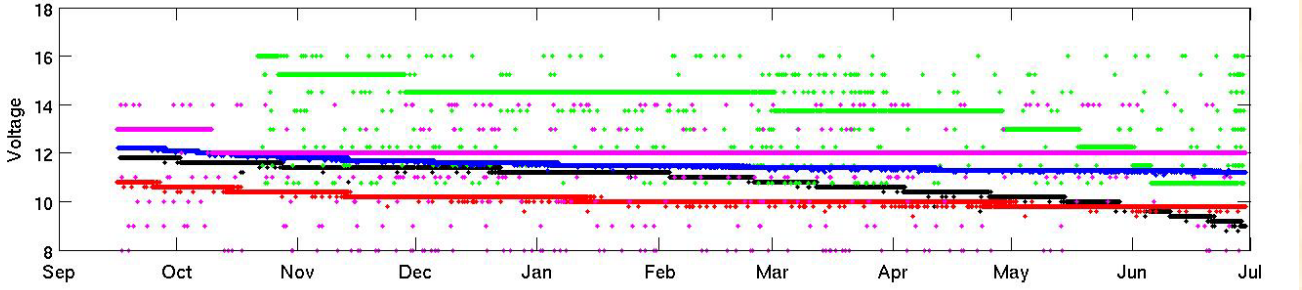






Cluster 1

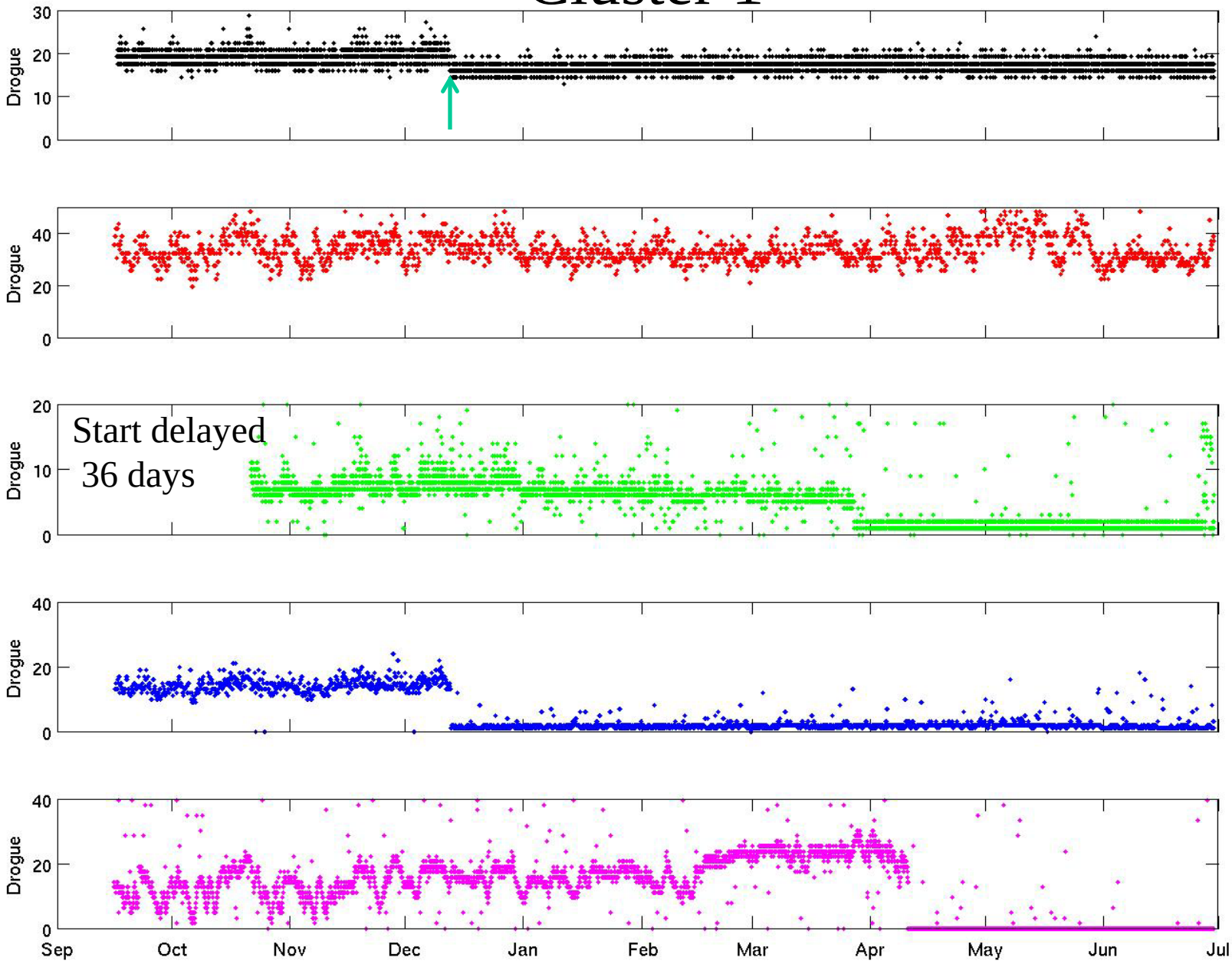
SIO

DBi

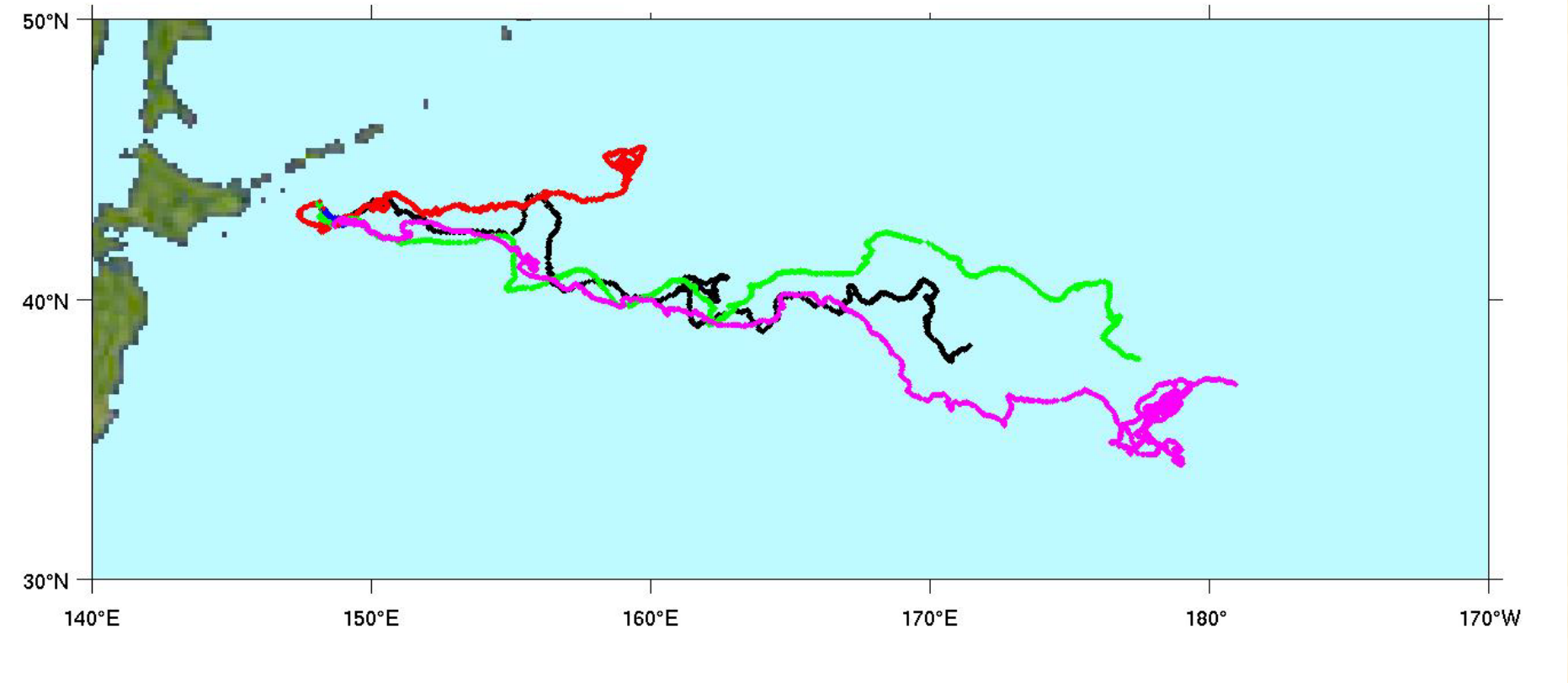
Met

P.G

M.Y



Cluster 2



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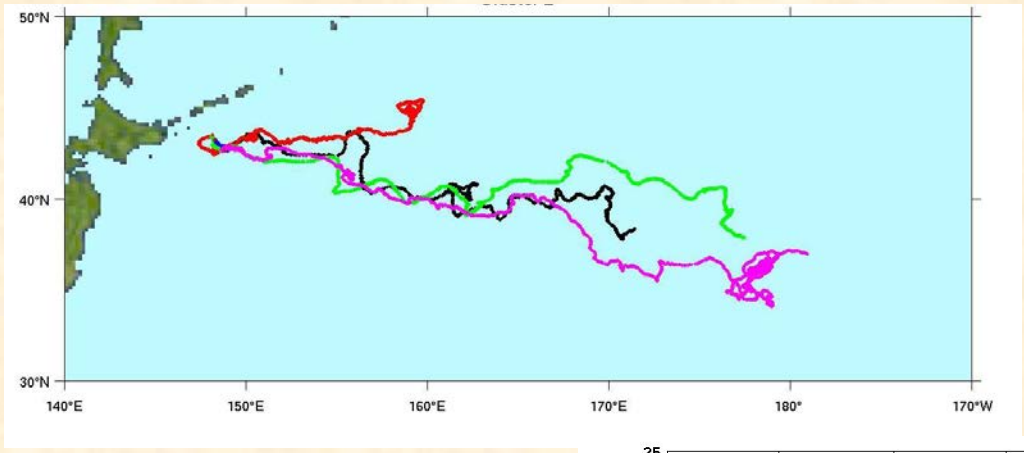
Blue = Pacific Gyre

Magenta = Marlin Yug



Cluster 2

Color Codes:

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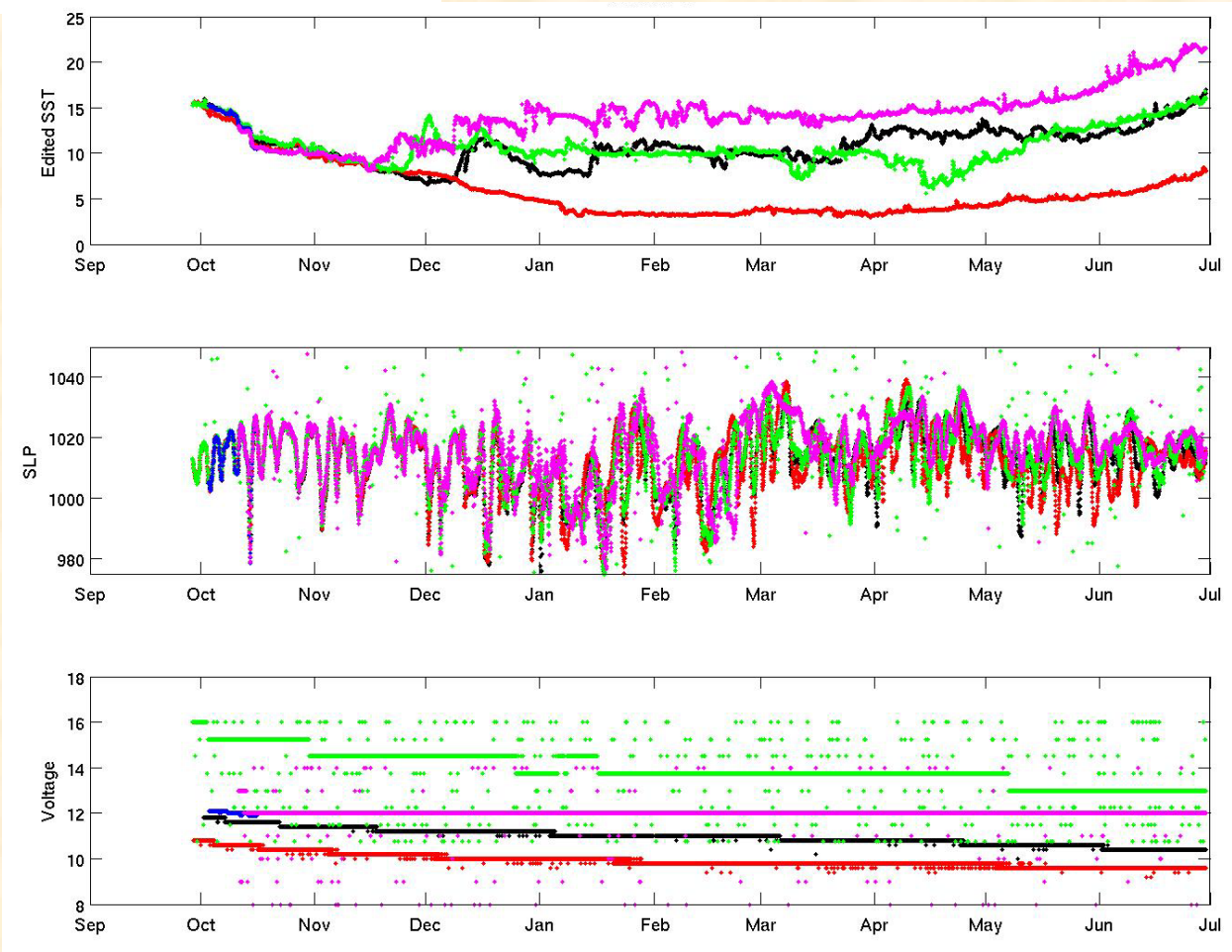
Red = DBi

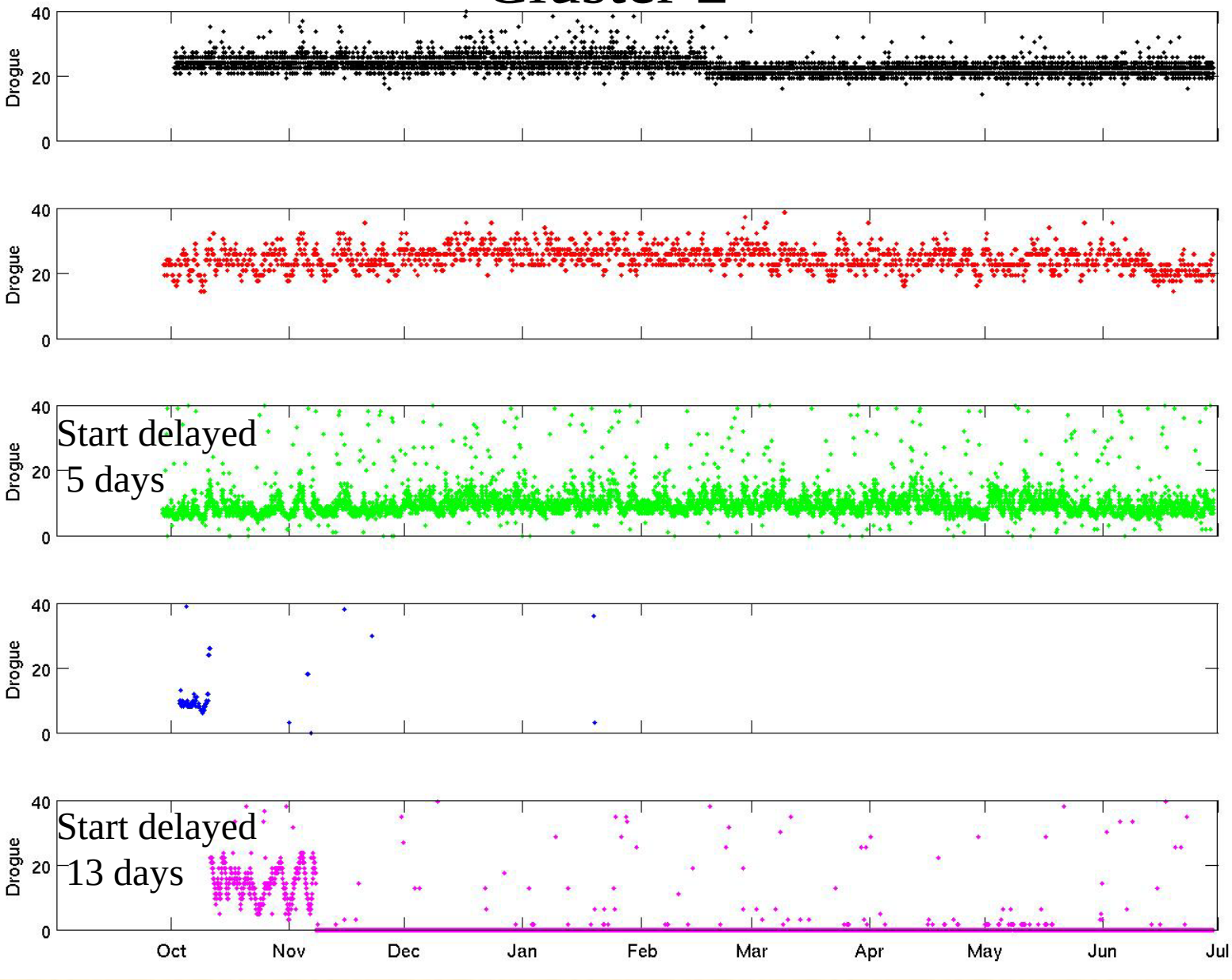
Green = Metocean

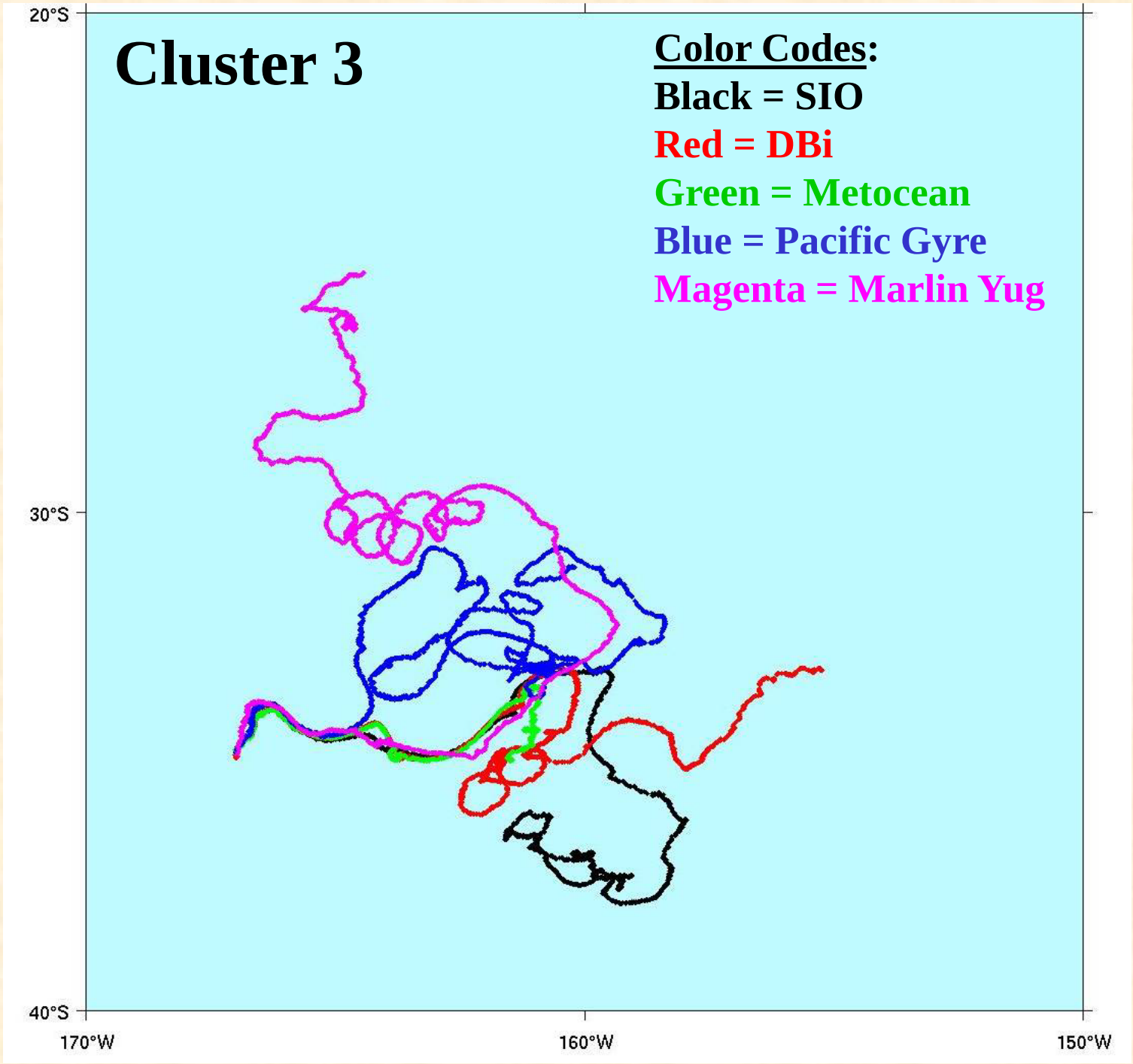
Blue = Pacific Gyre

Magenta = Marlin Yug

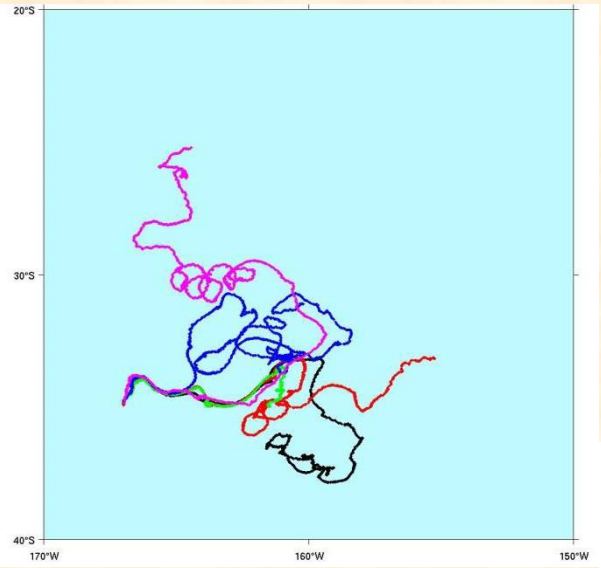


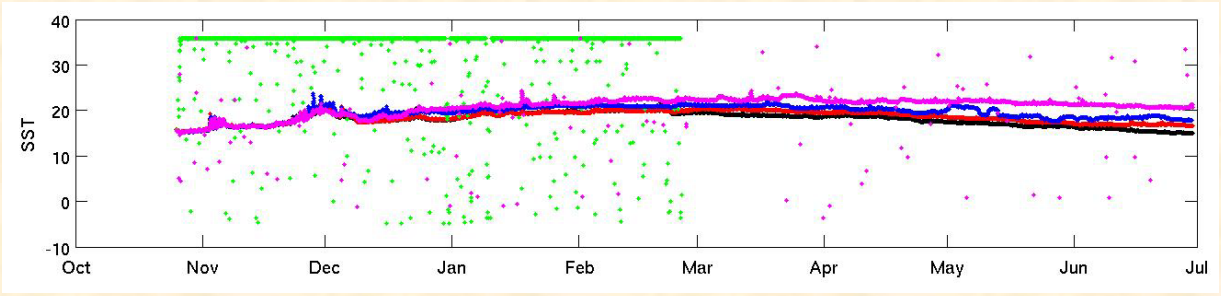
Cluster 2

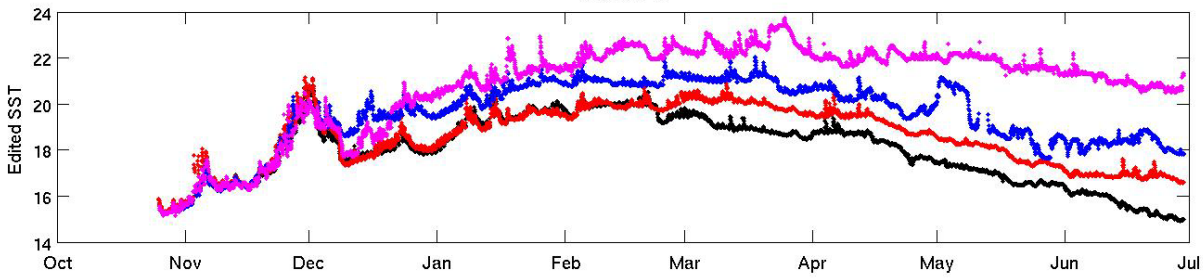

SIO
DBi
Met
P.G
M.Y
Drogue
40
20
0
Start delayed
5 days
Start delayed
13 days
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul

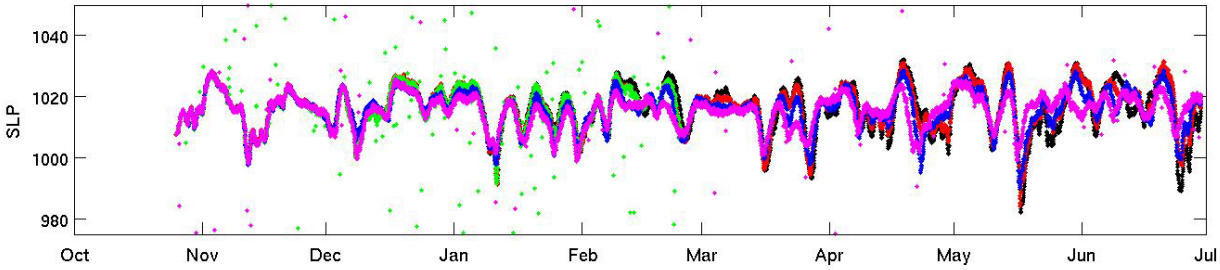

Cluster 3
Color Codes:
Black = SIO
Red = DBi
Green = Metocean
Blue = Pacific Gyre
Magenta = Marlin Yug
20°S
30°S
40°S
170°W
160°W
150°W

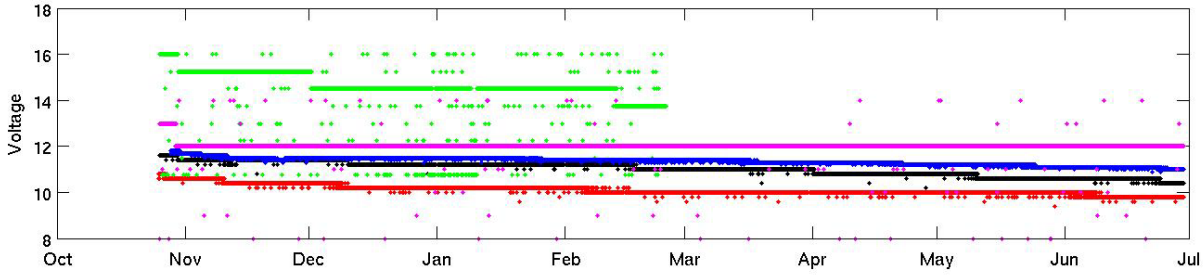
Cluster 3











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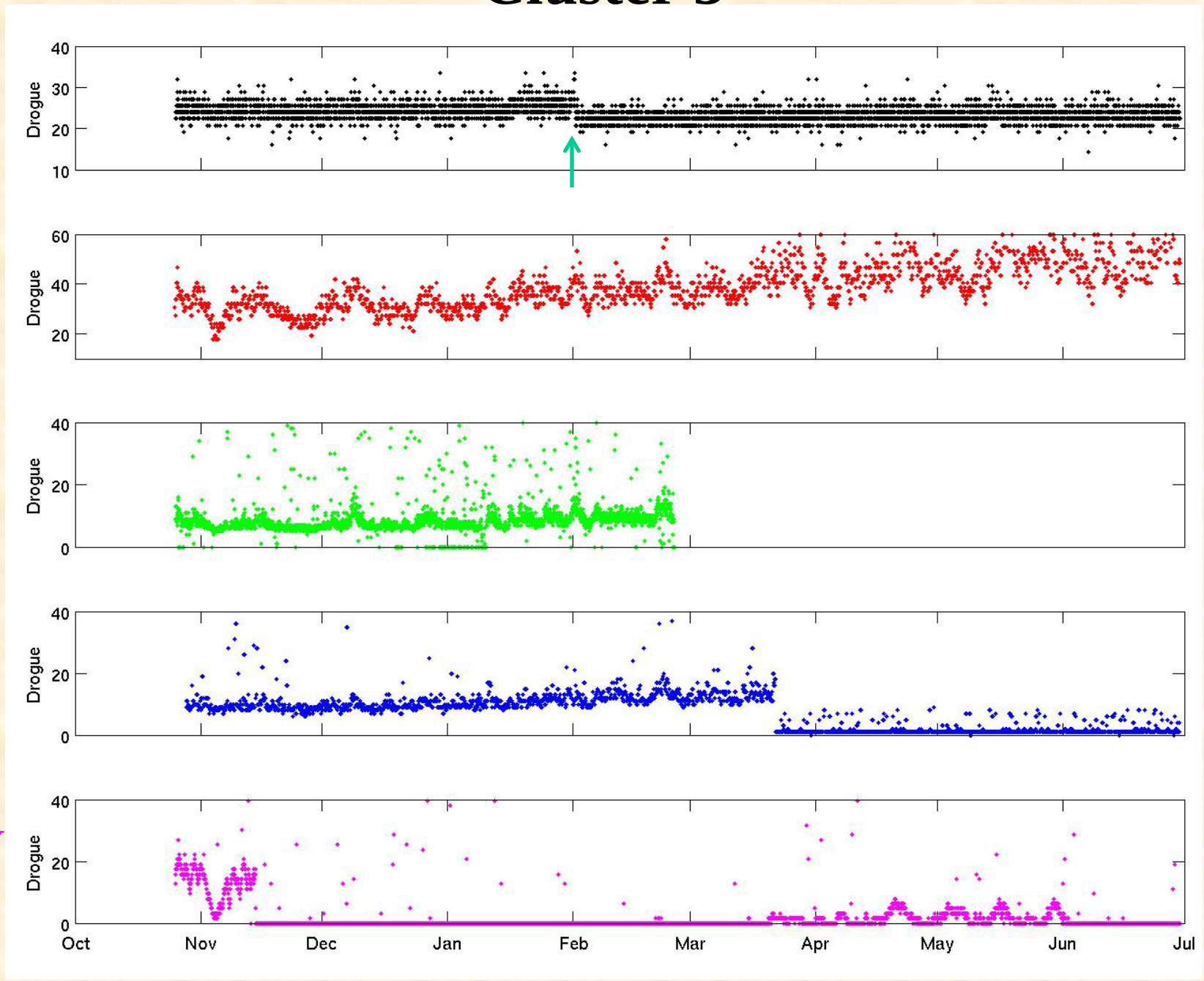
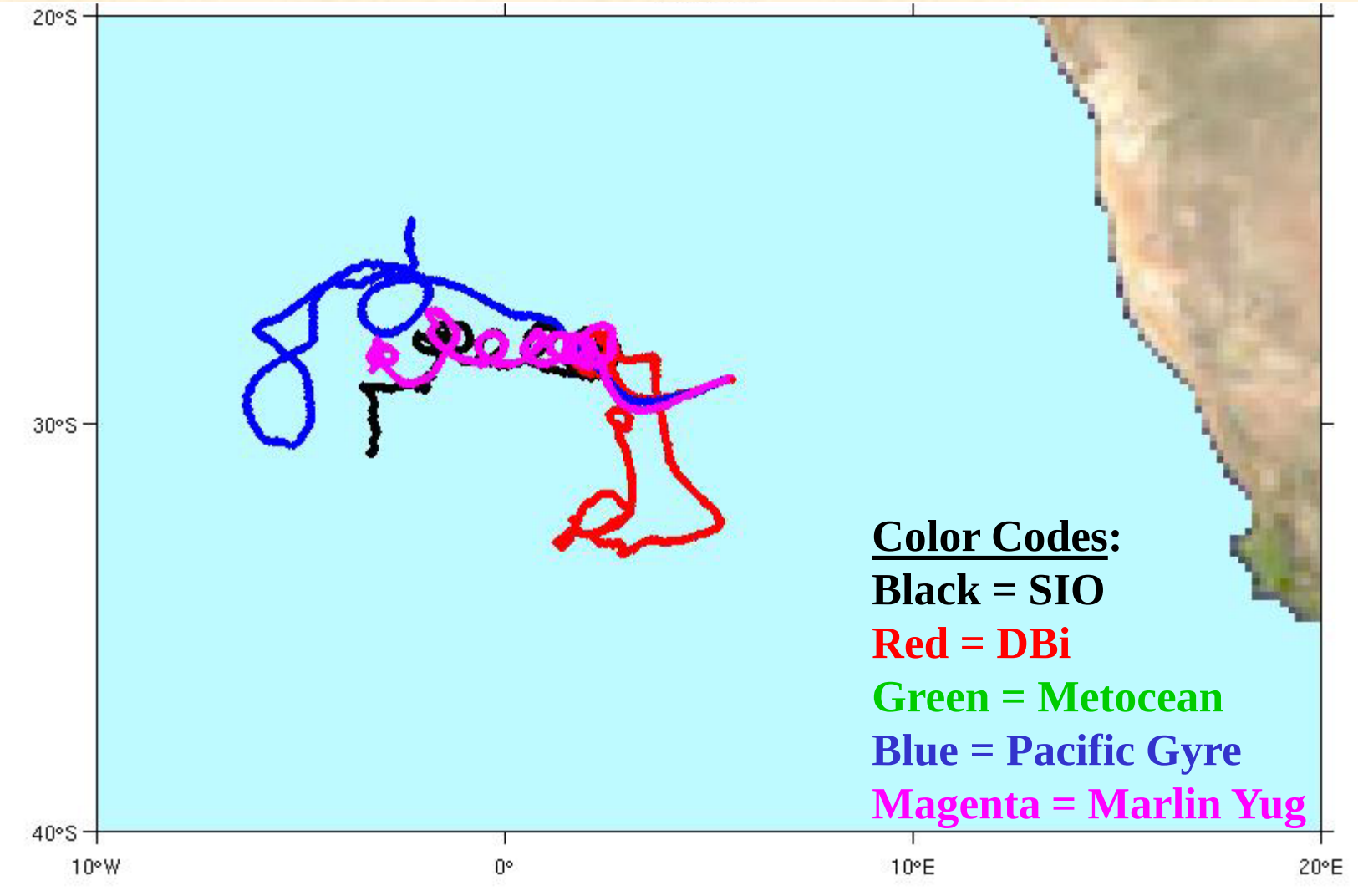

SIO
DBi
Met
P.G
M.Y
Drogue
40
30
20
10
60
40
20
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul

Cluster 4


20°S
30°S
40°S
10°W
0°
10°E
20°E
Color Codes:
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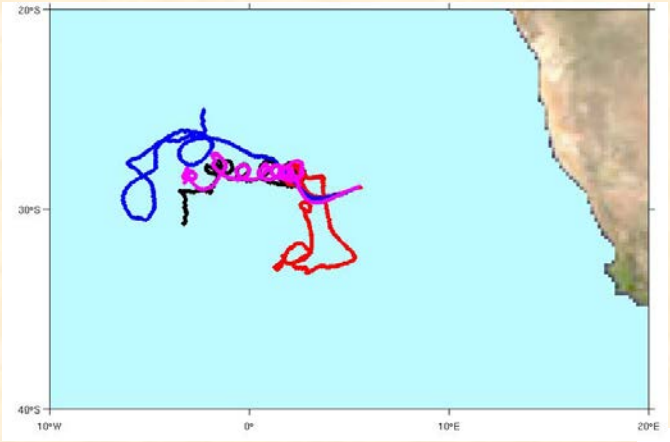
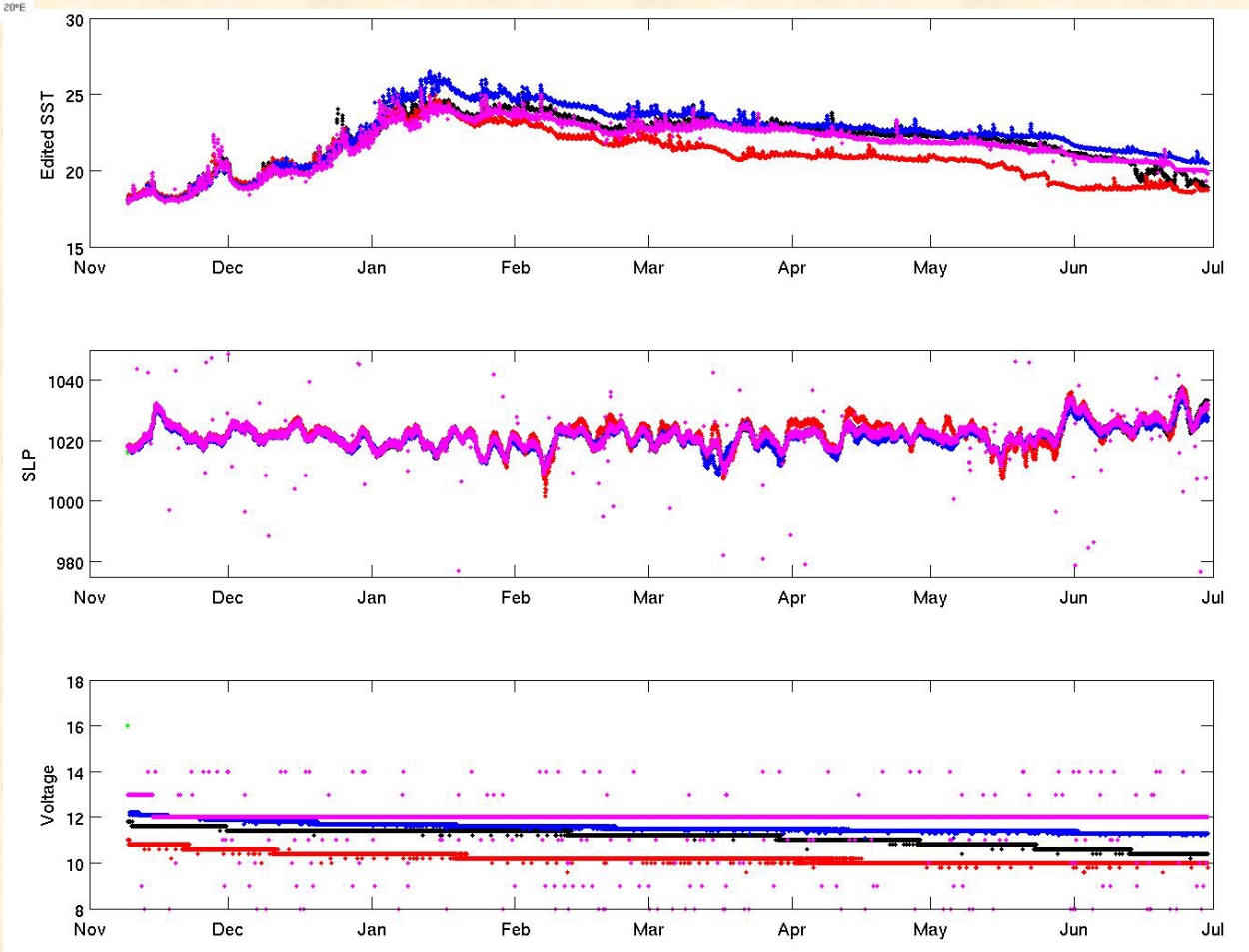


Cluster 4



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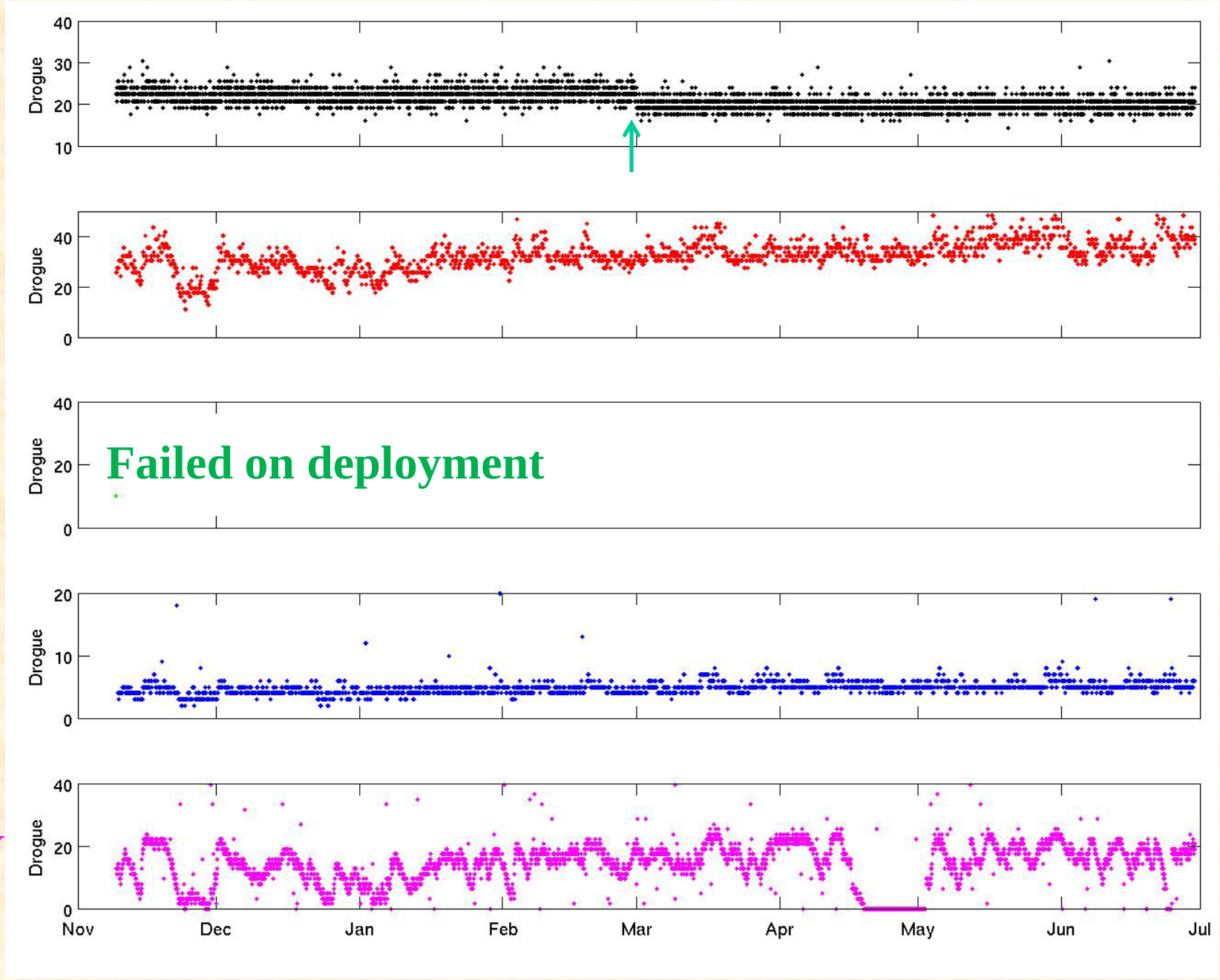

SIO
DBi
Met
P.G
M.Y
Drogue
Failed on deployment
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul

Clusters (transmitter and drogue life)

Manufacturers	1	2	3	4
SIO	374* 89	361* 143	334* 100	319* 113
DBi	374* 374*	361* 361*	334* 334*	319* 292
Metocean	289 195 Start delayed 36 days	336 336	124 124	F.O.D.
Pacific Gyre	374* 89	13 13 Start delayed 5 days	334* 149	319* 319*
Marlin Yug	374* 209	348 27 Start delayed 13 days	334* 21	319* 256
Max. Days Possible	**374**	**361**	**334**	**319**

Top number: Transmitter life, Bottom number: Drogue life
*** Alive or drogue on at end**
Last updated: September 23, 2015

Clusters (SST and SLP life)

Manufacturers	1	2	3	4
SIO	374* 374*	361* 361*	334* 334*	319* 319*
DBi	374* 374*	361* 361*	334* 334*	319* 319*
Metocean	289* 289*	336* 308	0 124*	F.O.D.
Pacific Gyre	374* 374*	13* 13*	334* 334*	319* 319*
Marlin Yug	374* 374*	348* 348*	334* 334*	319* 319*
Max. Days Possible	**374**	**361**	**334**	**319**

Top number: SST life, Bottom number: SLP life
*** Alive at end**
Last updated: September 23, 2015

Summary

Transmitters:

- All drifters from SIO, DBi, Marlin-Yug and Pacific Gyre are still alive after 319 days, except one Pacific Gyre that lasted only 13 days.
- All Metocean drifters quit transmitting after 124, 289, 336 days and one failed on deployment.
- One Pacific Gyre, one Marlin Yug and one Metocean had delayed starts of 5, 13 and 36 days respectively.

Drogue:

- All but one DBi drifters still have drogues attached.
- All SIO drifters lost their drogues before the transmitter quit, lasting less than 143 days.
- One Pacific Gyre still has its drogue attached after 319 days.
- Two Marlin Yug drifters lost their drogues before one month.

Summary

SST:

- All SSTs were good until the end of transmitter's life except one Metocean drifter that had SST bad since the beginning.

SLP:

- All SLP were good to the end except for one Metocean drifter that had SLP bad after 308 days.

Voltage:

- Drifters from manufacturers that used Argos-3 transmitters (SIO, DBi, Pacific Gyre) show faster voltage consumption.

Determining Drogue off

Tether Strain

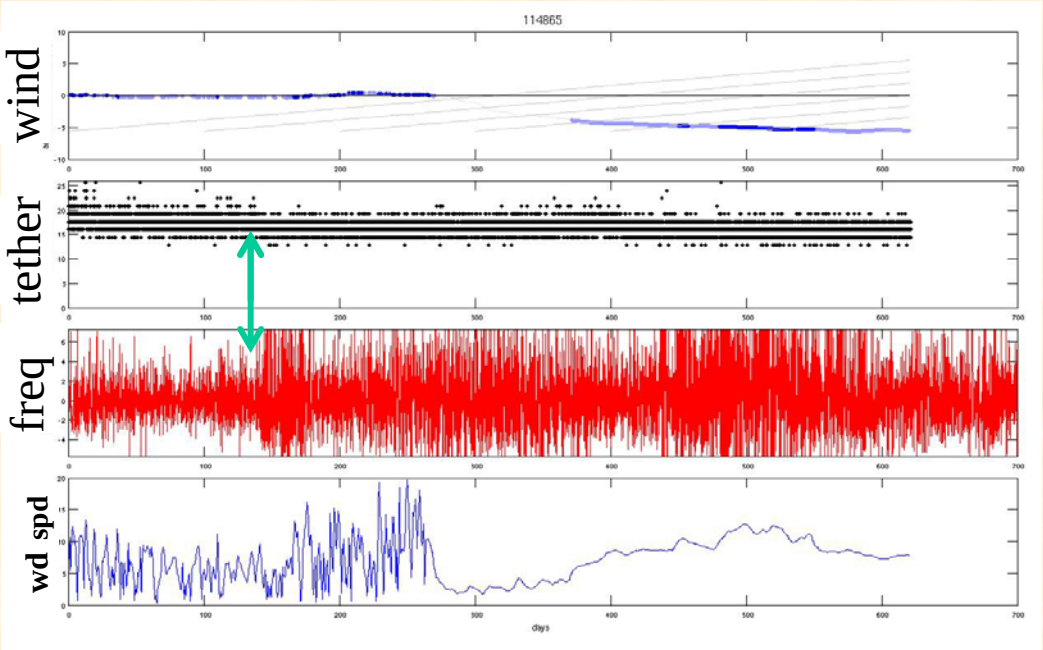
vs

GPS information

We evaluated GPS information and found Time To First Fix (TTFF) was the most robust indicator of drogue loss.

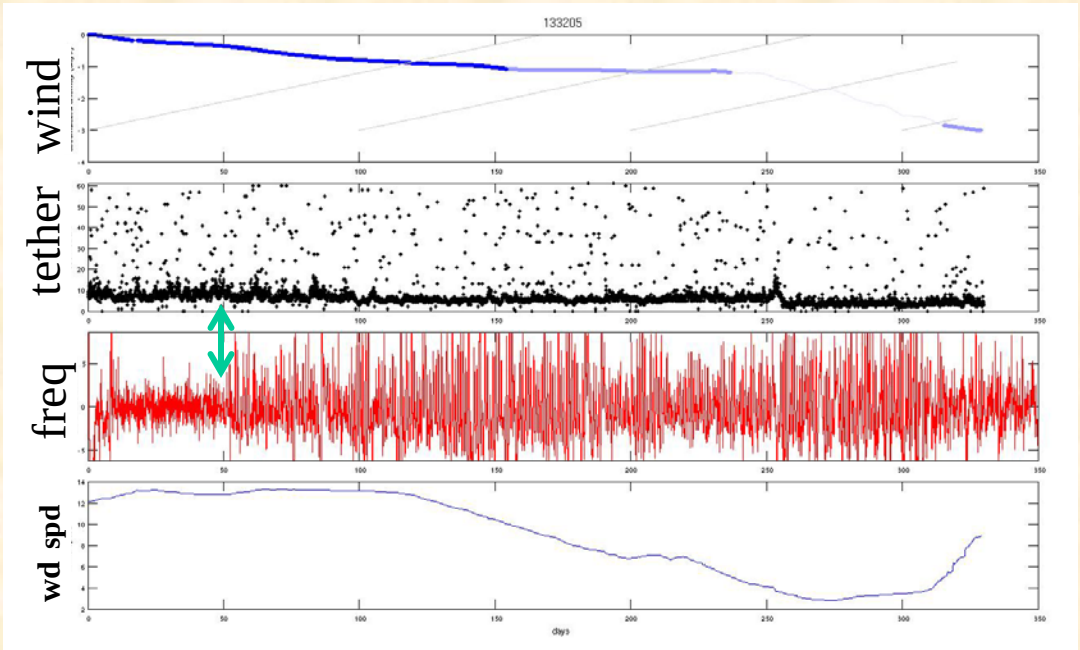
Can *only* TTFF be used to determine drogue loss? If so, the strain gauge can be eliminated from GPS drifters to

- Improve battery life
- Bring costs down



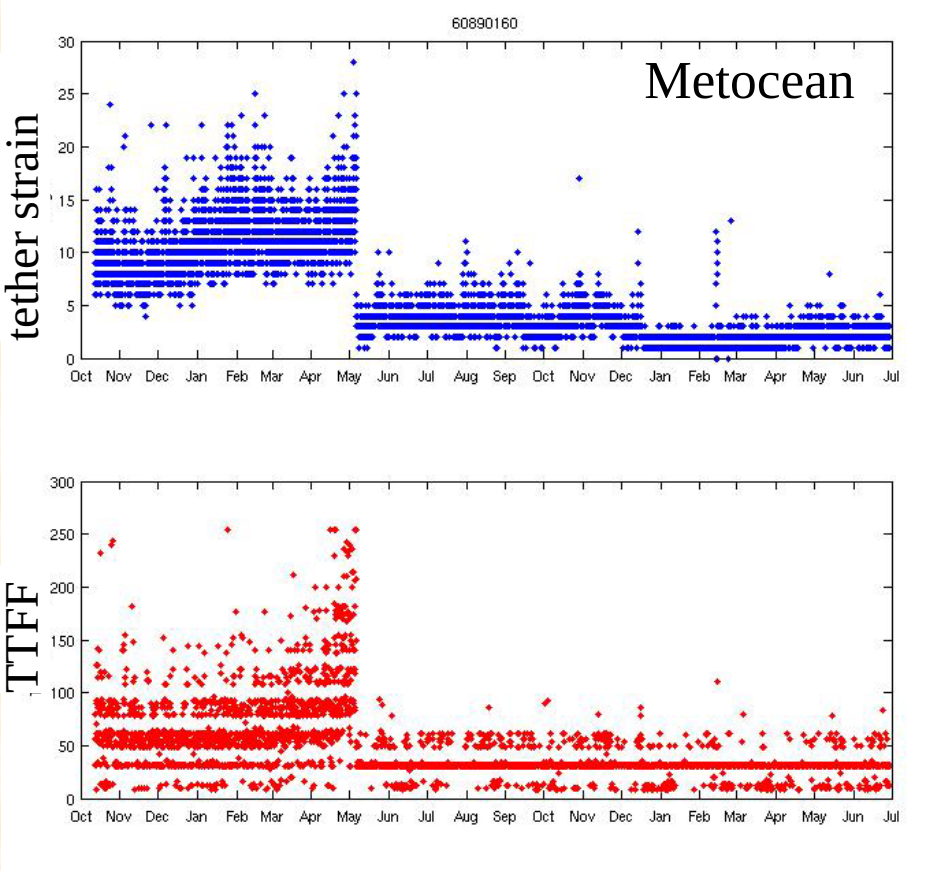
Argos Drifters

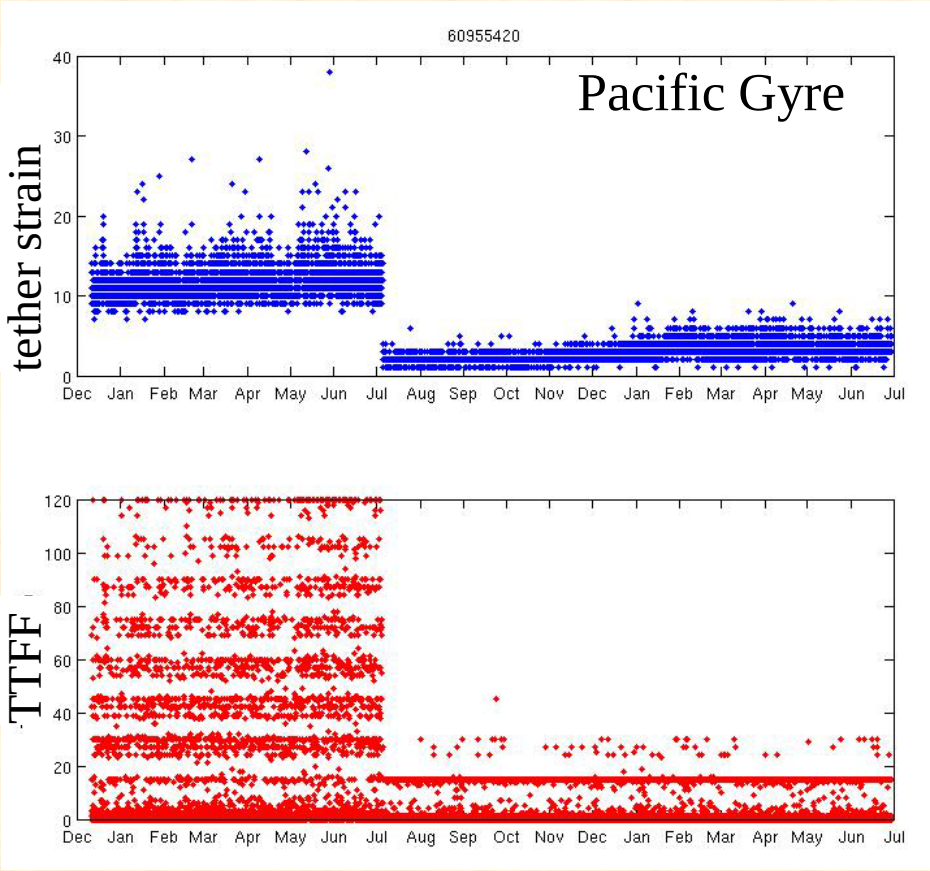
Difficulties determining drogue loss using tether strain for many SIO drifters because strain values do not drop much after drogue is off.



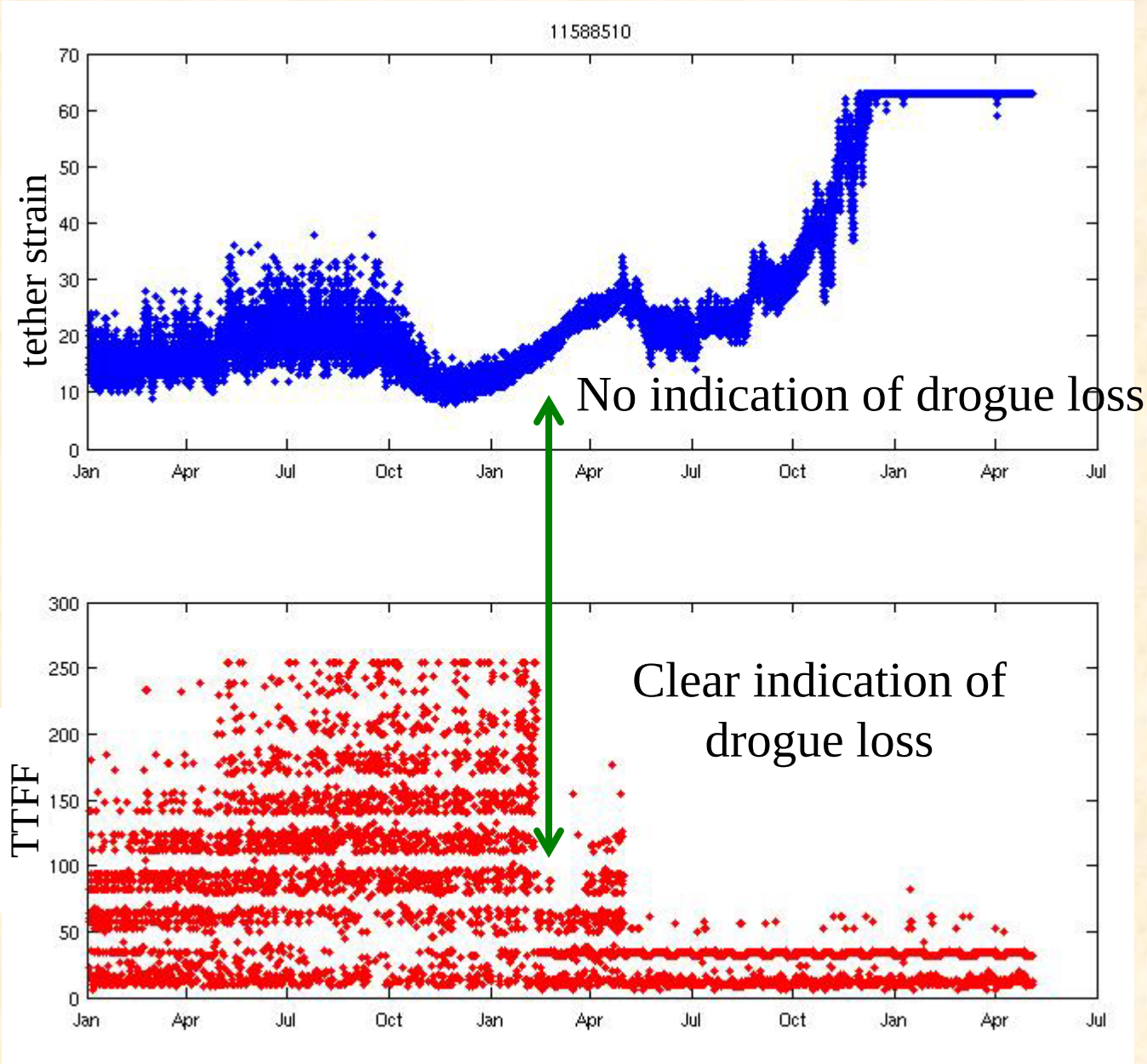
Example of a drifter not showing drogue loss using tether strain readings

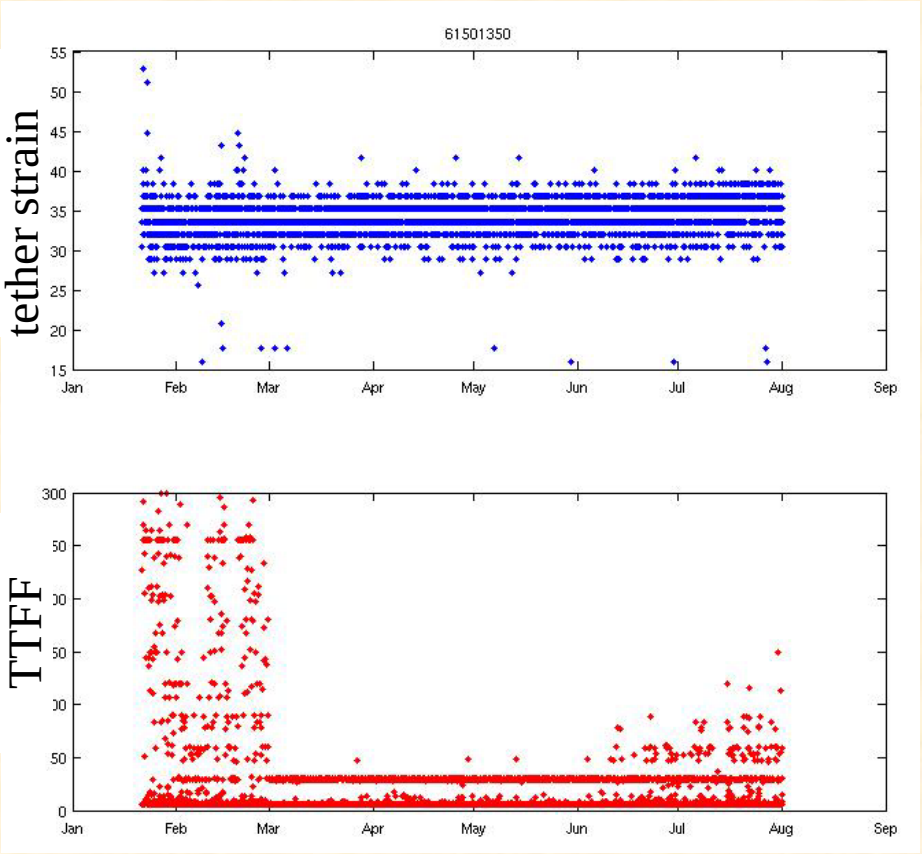
Clear indication of drogue loss in GPS drifters using both tether strain and TTFF values



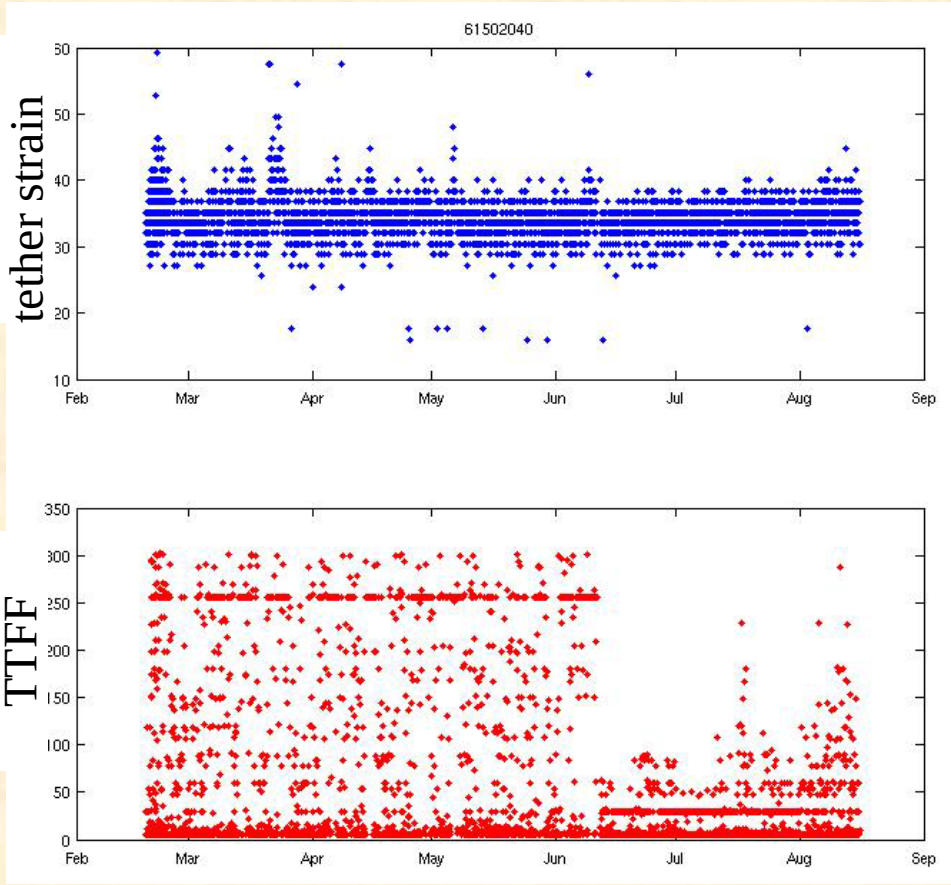


Using TTFF in GPS Drifters to Determine Drogue Loss



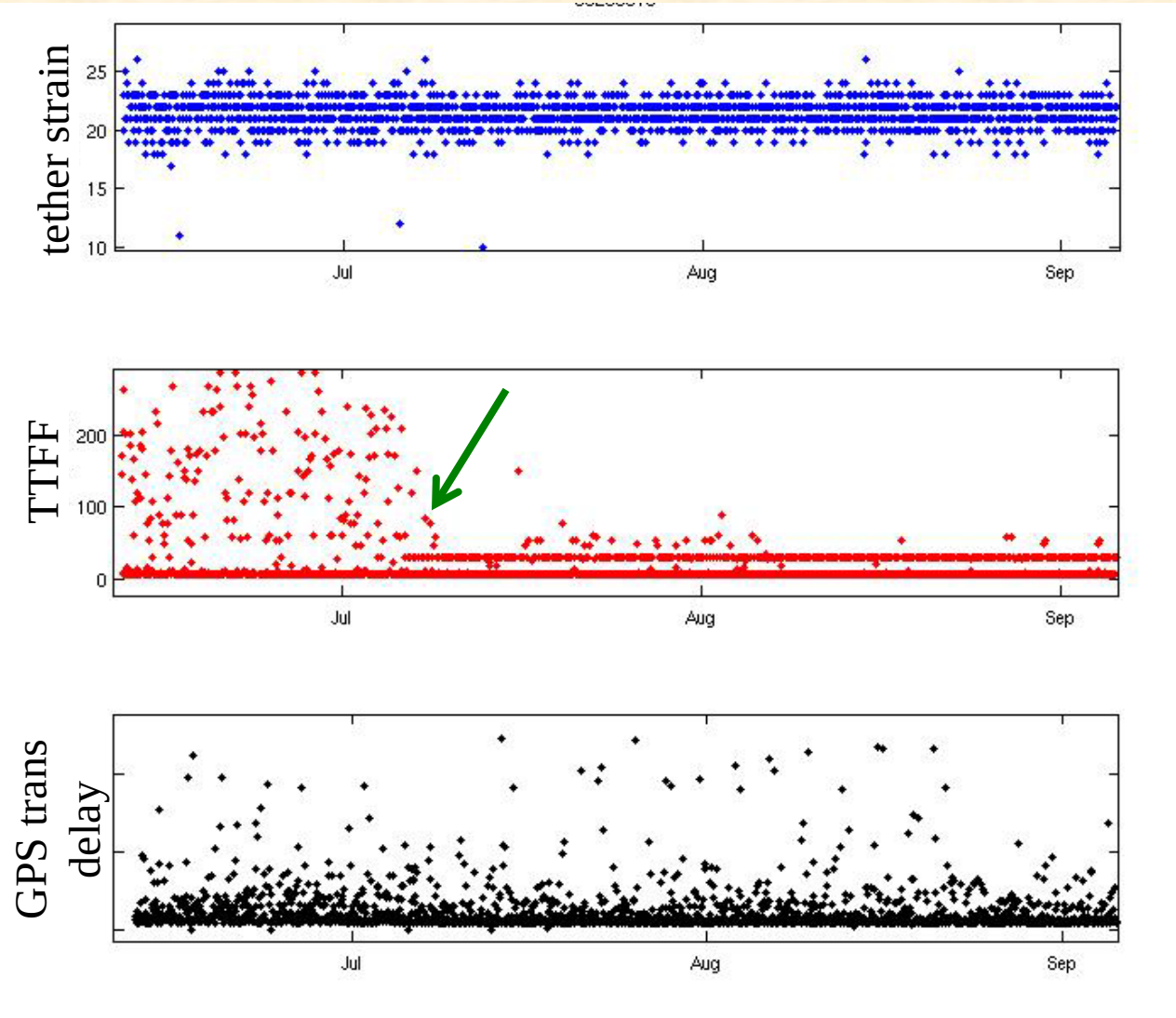


Drogue off determined using only TTFF, as strain values do not show any indication of drogue lost



(Both SIO drifters)

Using GPS transmission delay as drogue loss indicator



No drogue loss indication in SIO strain values

Clear drogue lost in TTFF values

GPS transmission delay does not help in determining drogue loss date.

Summary: Tether Strain vs TTFF

- Tether strain was implemented when it was determined that submergence sensor behavior was too manufacturer-dependent, and didn't always indicate drogue loss.

- Tether strain improved drogue off detection for all manufacturers at the time, when it was implemented across the array.

- SIO drifters show only slight drop in strain gauge values; determining drogue off is difficult. Strain gauge working very well in most cases for other manufacturers.

- TTFF is a very good indicator of drogue loss and has helped determine loss in cases where strain gauge didn't help.

- Having multiple methods of determining drogue loss is of great value. When one method fails, a backup exists.

Thank You!

Any questions?