DBCP GTS STATUS AND HIGHLIGHTS (2010)

1. Present status of buoy platforms

1.1 For drifting buoys, there was a peak of over 1600 operational buoys on the GTS this June and a peak in the number of Barometer buoys in May which demonstrates a growth in the network and the strong commitment to maintaining the network.

Country	Drifting Buoys	Drifting Buoys on GTS
AUSTRALIA	35	28
BERMUDA	1	0
BRAZIL	4	0
CANADA	39	29
EUROPE	64	63
FRANCE	43	18
INDIA	28	15
ITALY	45	13
JAPAN	11	7
NEW ZEALAND	17	13
NORWAY	4	4
SOUTH AFRICA	4	3
SOUTH KOREA	4	2
SPAIN	7	0
UK	17	13
USA	1736	1382
Total	**2059**	**1588 (=77%)**

Table 1: Drifting Buoys (mostly reporting via Argos) and those on the GTS by country for July 2010

Country	Moored Buoys	Moored Buoys on GTS
AUSTRALIA	5	0
BR-FR-US	15	15
BRAZIL	1	1
CANADA	50	40
EUROPE	7	7
FINLAND	1	0
FRANCE	19	16
GERMANY	12	1
IRELAND	7	5
ITALY	15	14
JAPAN	26	14
PERU	1	0
SOUTH KOREA	7	7
SPAIN	21	11
UK	77	64
US-ASCLME	2	2
USA	319	234
USA-IN	10	9
USA-INDO	3	2
Total	**598**	**444 = (74%)**

Table 2: Moored Buoys reporting via Argos and those on the GTS by Country for July 2010. N.B New Zealand 'Mooring' = stationary drifting buoy.

Year	Operational drifting buoys at JCOMMOPS	On GTS	% on GTS
July 1991	718	264	36.8%
July 1992	1162	474	40.8%
August 1993	1269	548	43.2%
September 1994	1246	587	47.1%
September 1995	1429	631	44.2 %
September 1996	1180	638	54.1%
September 1997	1159	581	50.1%
August 1998	1230	543	44.1%
July 1999	1270	728	57.3%
July 2000	1385	807	58.3%
July 2001	1338	763	57%
July 2002	919	459	49.9%
August 2003	1436	752	52.3%
July 2004	1727	950	55%
June 2005	2396	1157	48%
August 2006	2218	1237	55%
August 2007	2026	1295	64%
July 2008	2069	1377	66%
July 2009	2032	1405	69%
July 2010	2059	1588	77%

Table 3. Evolution of GTS Buoy data percentage

1.2 Amongst the drifting and moored buoys reporting on the GTS in BUOY message formats; the following variables were measured in June 2010. There was a bit of fluctuation in the number of drifting buoys reporting Air Pressure globally this year, with a peak of 697 in May 2010.

Variable	Any	Air P	P Tend.	SST	Air T	Hum.	Wind	Waves	Sub/T
Drifting Buoys	**1588**	**674**	**632**	**1452**	**21**	**0**	**4**	**5**	**35**
Moorings	**444**	**269**	**233**	**324**	**326**	**197**	**310**	**284**	**88**

Table 4. Drifting and Moored buoys – variables being reported on the GTS

1.3 Figure 1 shows the evolution in Air pressure percentage globally during the period 2005 to -2010.

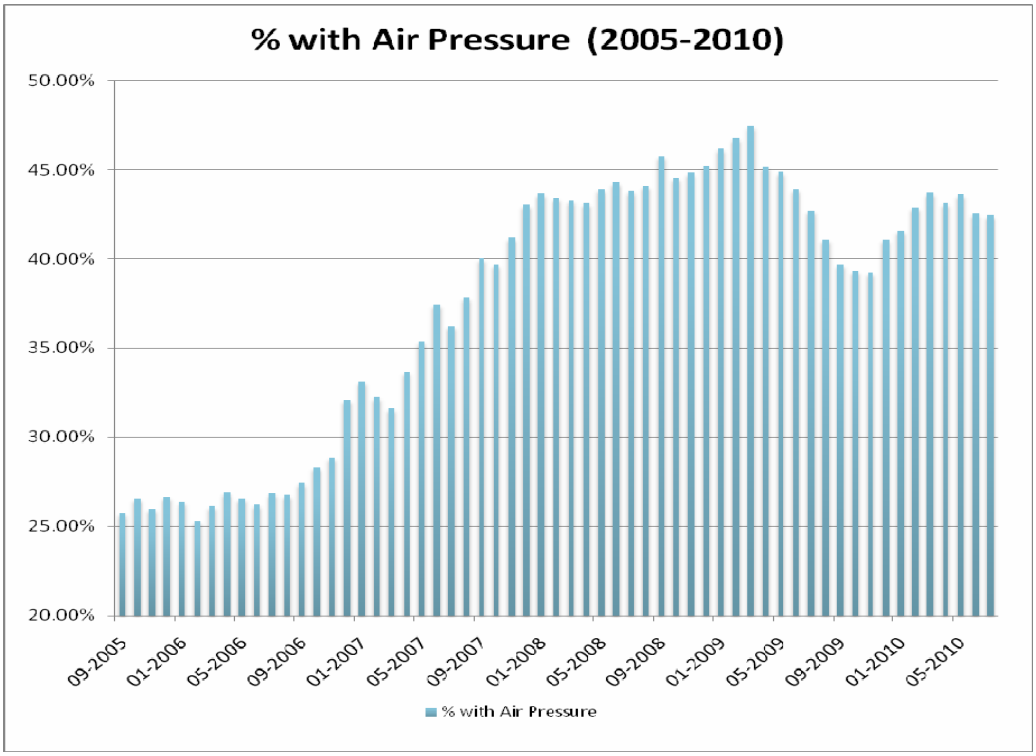


Figure 1: Monthly evolution of the percentage of operational drifting buoys reporting air pressure on GTS from late 2005 to July 2010

1.4 The JCOMM Observations Coordination Group's Implementation Goals, is to eventually equip at least 700 drifting buoys with barometers outside of the tropics. This goal was not quite achieved this year. In July 2010 the number in the higher latitudes (above 30 degrees N/S) was ~513, compared with 470 in July 2009. Deployment opportunities are a limiting factor in achieving the 700 requested by the JCOMM OCG.

1.5 The Global Drifter Center, supported by NOAA, continues to offer the Barometer upgrade opportunity for standard SVP drifters for ~$1000 per unit (see the following URL for details: http://www.jcommops.org/dbcp/svpb_upgrade.html).

Figure 2 shows the number of operational drifting buoys over the last 19 years, which increased from 2009-10 and well above the desired number of 1250.

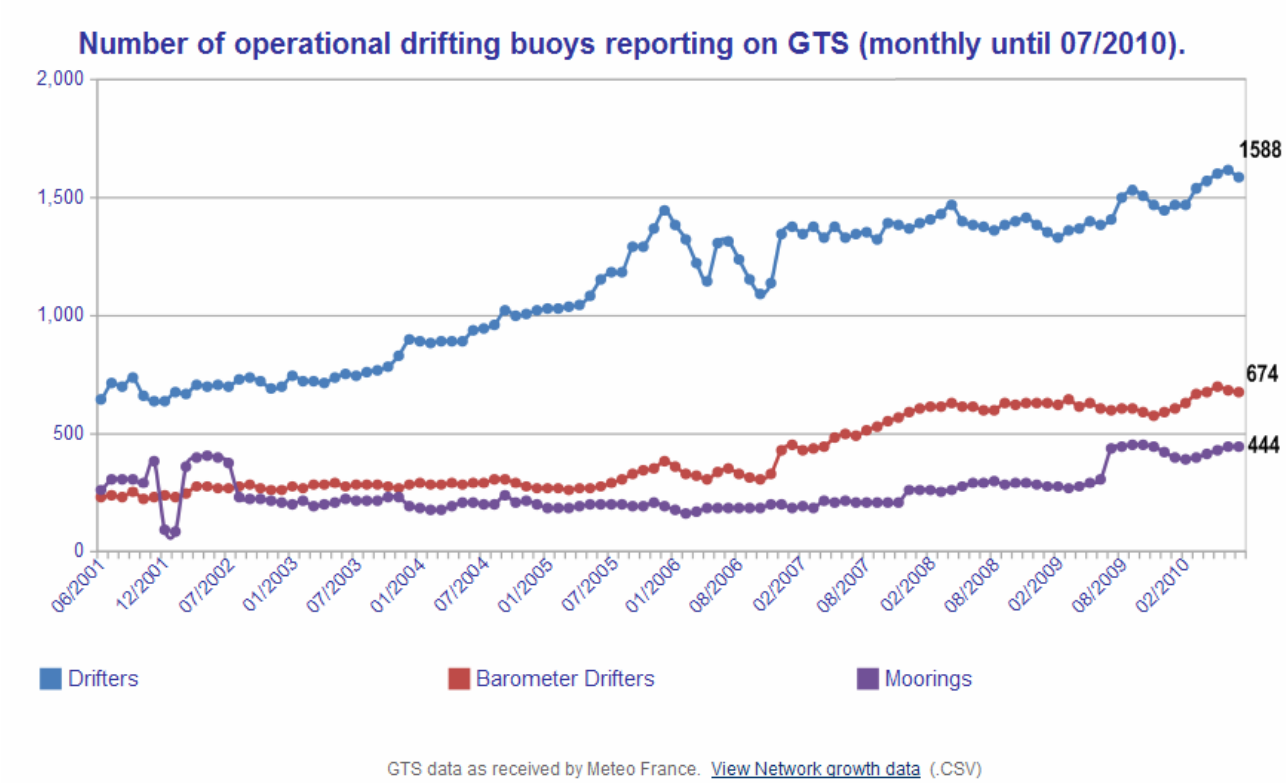


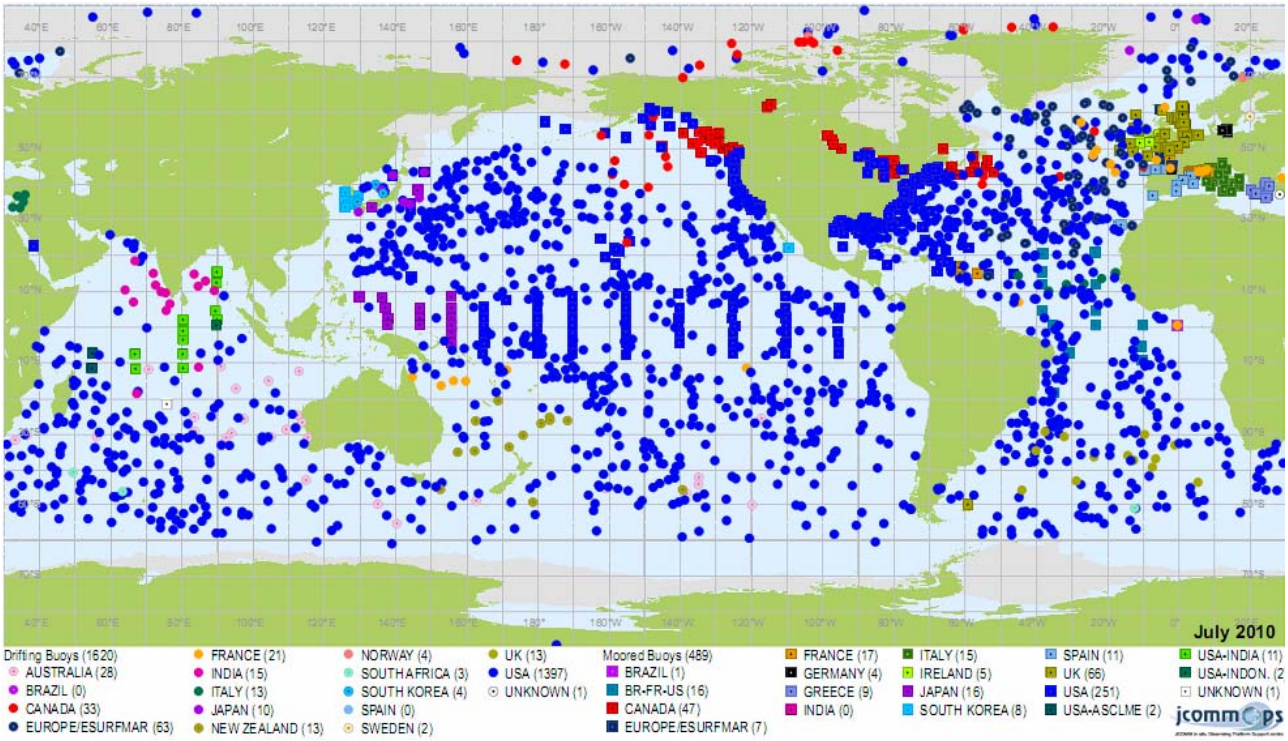
Figure 2: Monthly evolution of the number of operational drifting buoys reporting on GTS from January 2001 to July 2010 and those reporting air pressures. Operational Moored buoys are also included. (Data derived by statistics computed from GTS in situ marine data provided by Météo-France).

1.6 Figure 2 demonstrates that the number of drifting buoys has been maintained well above 1250 and about half of those measuring Air Pressure. The number of Barometer buoys had grown steadily throughout the intersessional period, though in the last three months that has leveled off a little. Last year the total percentage of Barometer buoys began decreasing in August (dipping at 39%) which was a concern. This year however the percentage has increased again and while it is not back to the levels seen early 2009 (~47%), it has remained at 43-44% for most of 2010. There has been a significant increase in number of Barometer buoys in the southern Indian Ocean.

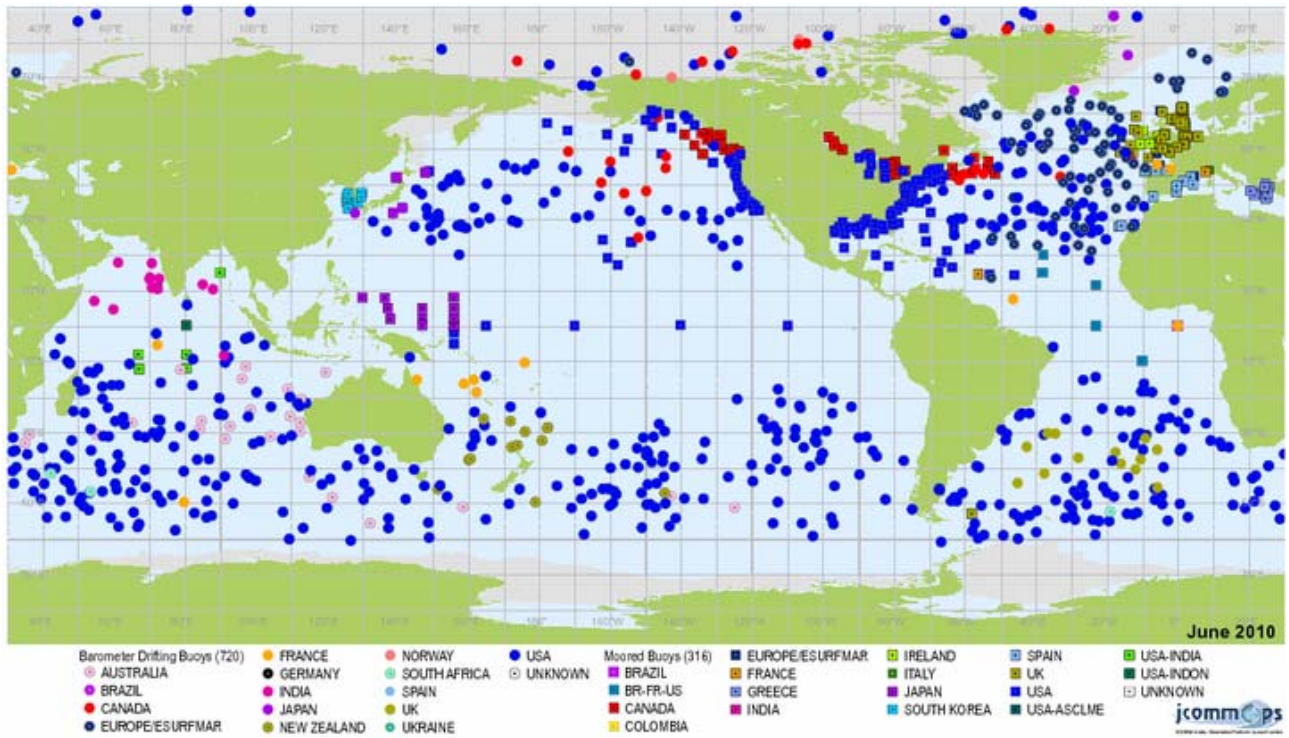
- Figure 1 above indicates the evolution and fluctuations in percentage of Barometer Buoys from 2005-2010, demonstrating the progress made by the Panel in recent years.
- During the inter-sessional period, an interactive version of Figure 2 was added to the DBCP website[1]. It is updated each month by JCOMMOPS. An equivalent text file is also available on the website.

1.7 Map 1 shows the buoy status at the end of July 2010. The spread of drifters has remained good throughout the inter-sessional period, although the northern Indian has begun to be quite sparse and the north Western Pacific is still not filled. Fortunately, the RAMA moored buoy array in the Indian Ocean has filled in many of the gaps and provided cruises for deployment of drifters, however the continuity of data is adversely impacted by vandalism and difficulties replacing platforms. Again this year, the spread across the Arctic region is better than it had been in the past. For the gulf of Guinea, many drifters were deployed in this region in the last year, however they appear to be moving away from the African continent currently. Many of the buoys deployed in this region last year (with help from the US Navy) were beached or failed.

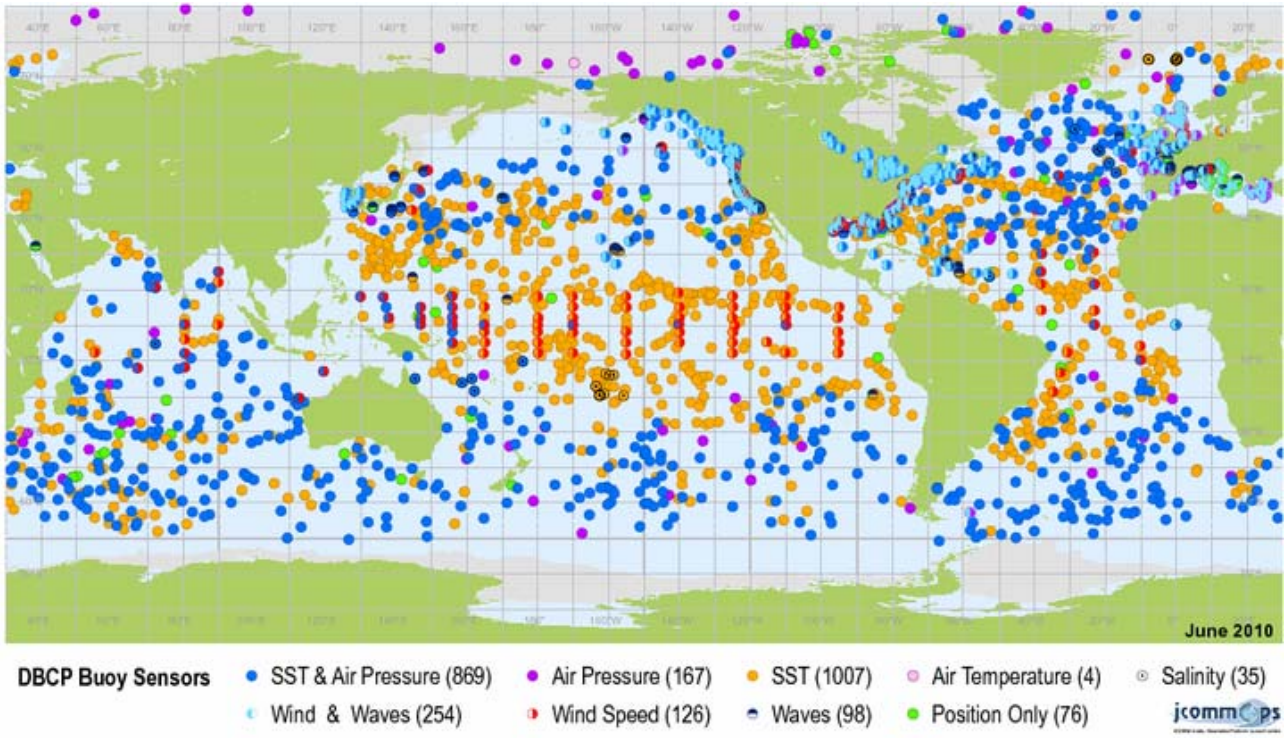
1 http://dbcp.jcommops.org/network/status.html#main-bottom



Map 1: DBCP monthly status by country for July 2010. (Data Buoys reporting on the GTS via Météo-France)



Map 2: DBCP Barometer Buoy monthly status by country for June 2010. (Data Buoys reporting Pressure measurements on the GTS via Météo-France)



Map 3: Drifting and moored buoys reporting SST, Air Pressure, Waves and Wind in June 2010. (Data Buoys reporting on the GTS via Météo-France)

2. Platforms in the Southern Ocean –Air Pressure

2.1 The Southern Ocean Buoy Programme, as part of the DBCP Implementation Strategy, aims to have 300 operational drifting buoys with barometers distributed across the Seas south of 40°S. Currently, the number of operational barometer buoys is around 195, which is the highest July value ever. The total Number of buoys passing through the region at some point during the year was 314. It is clear from Map 3 (above) that a vast majority (80%) of buoys south of 40°S are recording air pressure.

2.2 During the Inter-sessional period the number went up to a peak of 217 in March 2010 and stayed around that until May, which was approaching the goal of 300.

Month	Total number of Barometer buoys
AUG 2009	157
SEP 2009	150
OCT 2009	142
NOV 2009	145
DEC 2009	153
JAN 2010	166
FEB 2010	189
MAR 2010	217
APR 2010	210
MAY 2010	209
JUN 2010	202
JUL 2010	195

Table 5. Number of Barometer buoys in the Southern Ocean each month for the year to July 2010.

2.3 The main participants were: NOAA / AOML, and University of Delaware United States of America; Bureau of Meteorology (BOM), Australia; Dunstaffnage Marine Laboratory, UK & Met Office, United Kingdom; Météo-France and CLS; New Zealand Meteorological Service; and South African Weather Service.

2.4 Plans from last year : The deployment plans last year were for at least 180 buoys with Barometers (including 36 upgrades) to be deployed south of 40°S. The actual deployments totalled ~ 146 SVPBs, as notified to JCOMMOPS, and were as follows:

- USA (Inc barometer upgrades) : 126
- Australia: 54
- UK: 7
- New Zealand: 4
- France: 2 (Argos-3 buoys)

2.5 Plans for next year: Possible deployment ships are as follows:

- SA Agulhas
- Marion Dufresne
- Marion and Gough Island supply vessels, Fishing vessels on Tristan Da Cunha.
- British Antarctic Survey ships (LM Gould, E Shackleton)
- Polarstern - this Antarctic summer season traveling from Bremerhaven to Wellington New Zealand, to Antarctica and back again
- Along AX-18 (Buenos Aires-Cape Town) by NOAA,
- Along IX-28 to Antarctica
- NOAA research vessels

Country	Buoys purchased or planned	Additional upgrades	Total
Australia	5	5	10
France (*)	0	30	30
Germany	0	0	0
New Zealand	10		10
South Africa	18	25	43
UK	8	0	8 *
USA	~140	-	140
Total	**188**	**60**	**241**

Table 6: SOBP Proposed Commitments for the period August 2010 to July 2011
** One buoy from last year*

2.6 The deployment plans for GDP are as follows, though the availability of deployment opportunities impact these plans during the year:

- Southern Indian Ocean:
  - 30 SVPB's (along with Meteo France)
- Southern Pacific Ocean:
  - 30 SVPB's (along with the MS NZ)

    - 15 SVPB's (aboard the LM Gould)
- Southern Atlantic Ocean:
    - 10 SVPB's (along with Argentina Navy)
    - 25 SVPB's (along with SAWS)
- Drake Passage:
    - 25-40 SVPB's (with NOAA Fisheries)

3. Data quality

3.1 The figures below provide some estimates of drifting and moored buoy data quality for air pressure, sea surface temperature, and wind as compared with Numerical Weather Prediction model fields.

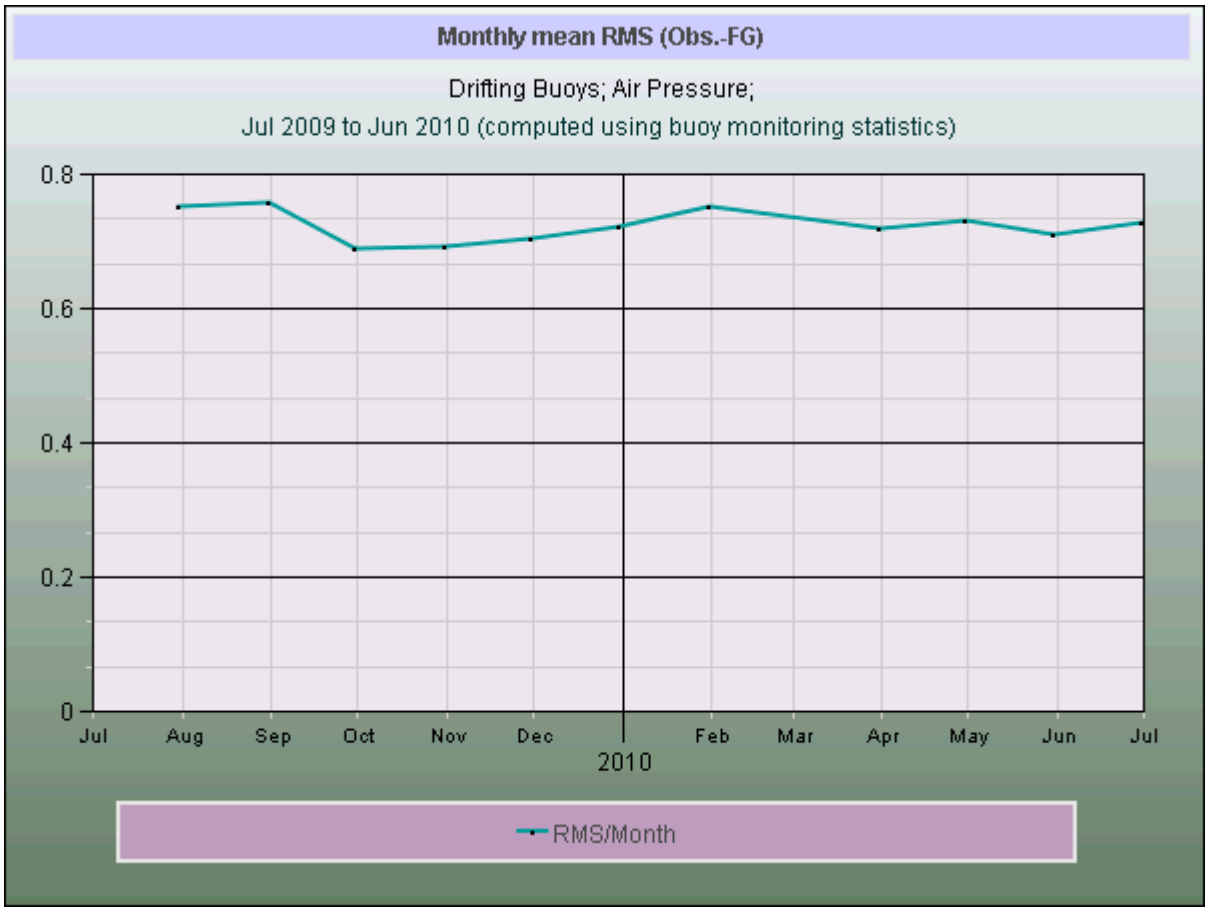


Figure 3: Drifting buoy Air Pressure Quality Control

3.2 The RMS (Obs.-FG) for drifting buoy air pressure data based on ECMWF buoy monitoring statistics for the period July 2009 to June 2010 remained below 0.8 for all of 2010 and below 0.7 for much of the inter-sessional period.

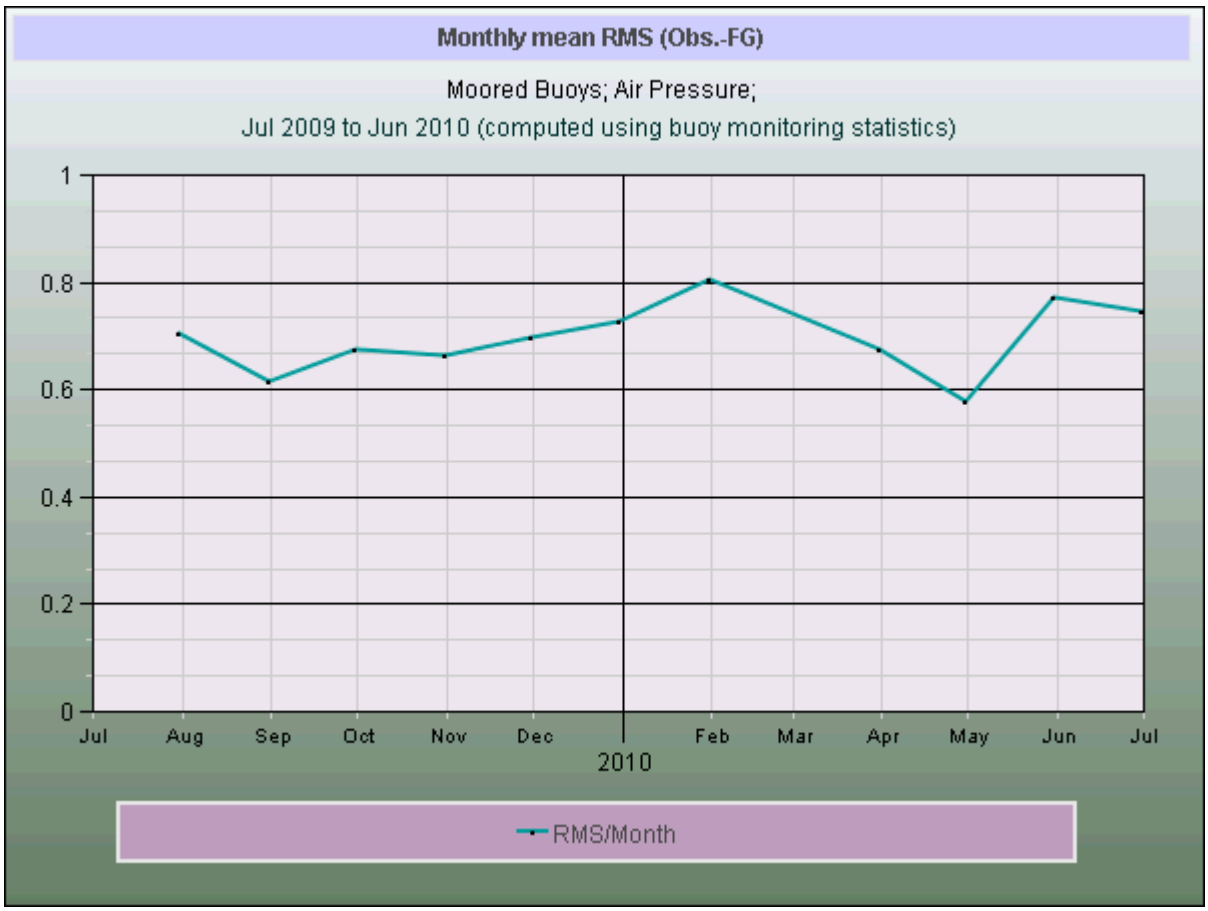


Figure 4: Moored buoy Air Pressure Quality Control

3.3 The RMS (Obs.-FG) for moored buoy air pressure data based on ECMWF buoy monitoring statistics for the period July 2009 to June 2010 remained between 0.58 and 0.81 for the last year, which indicates that it is remaining steady over time.

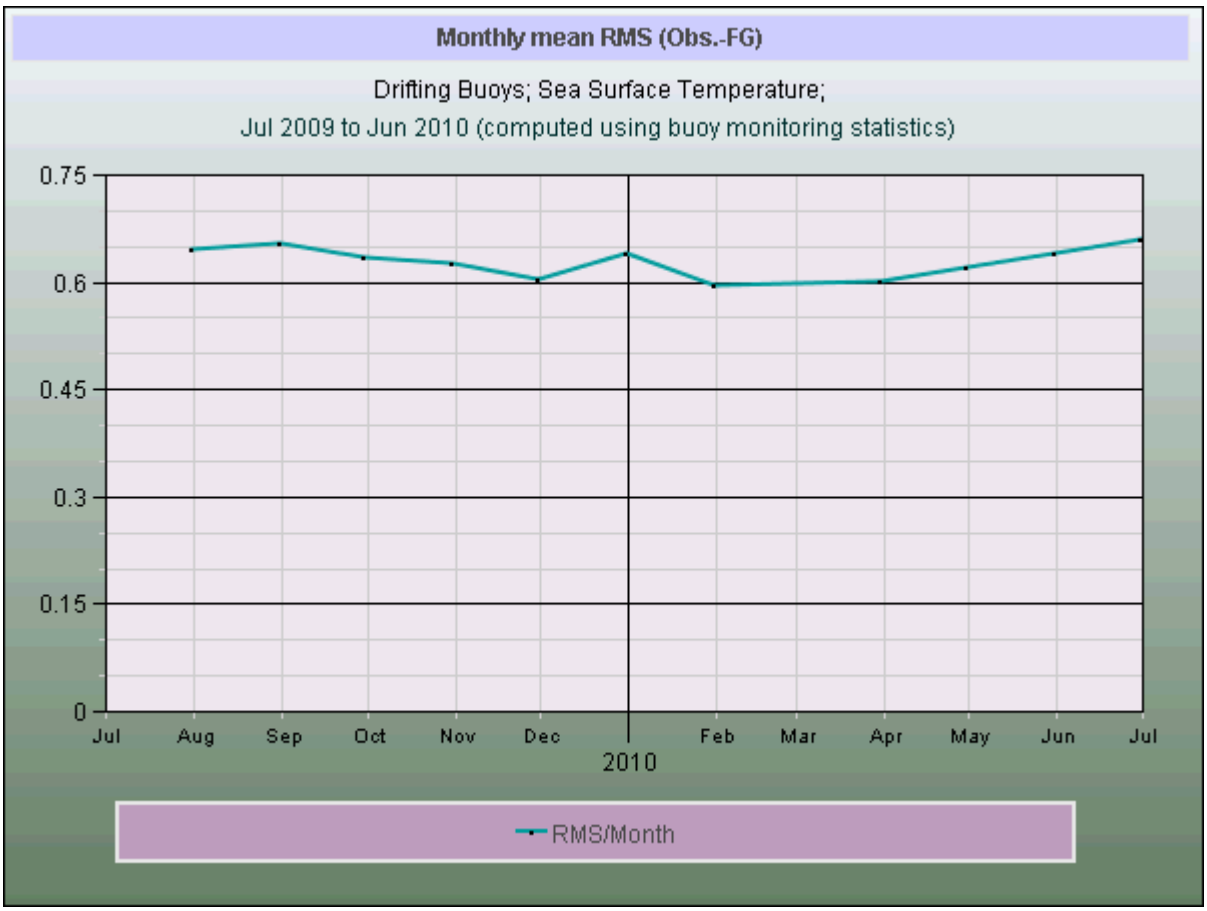


Figure 5a: Drifting buoy SST Quality Control

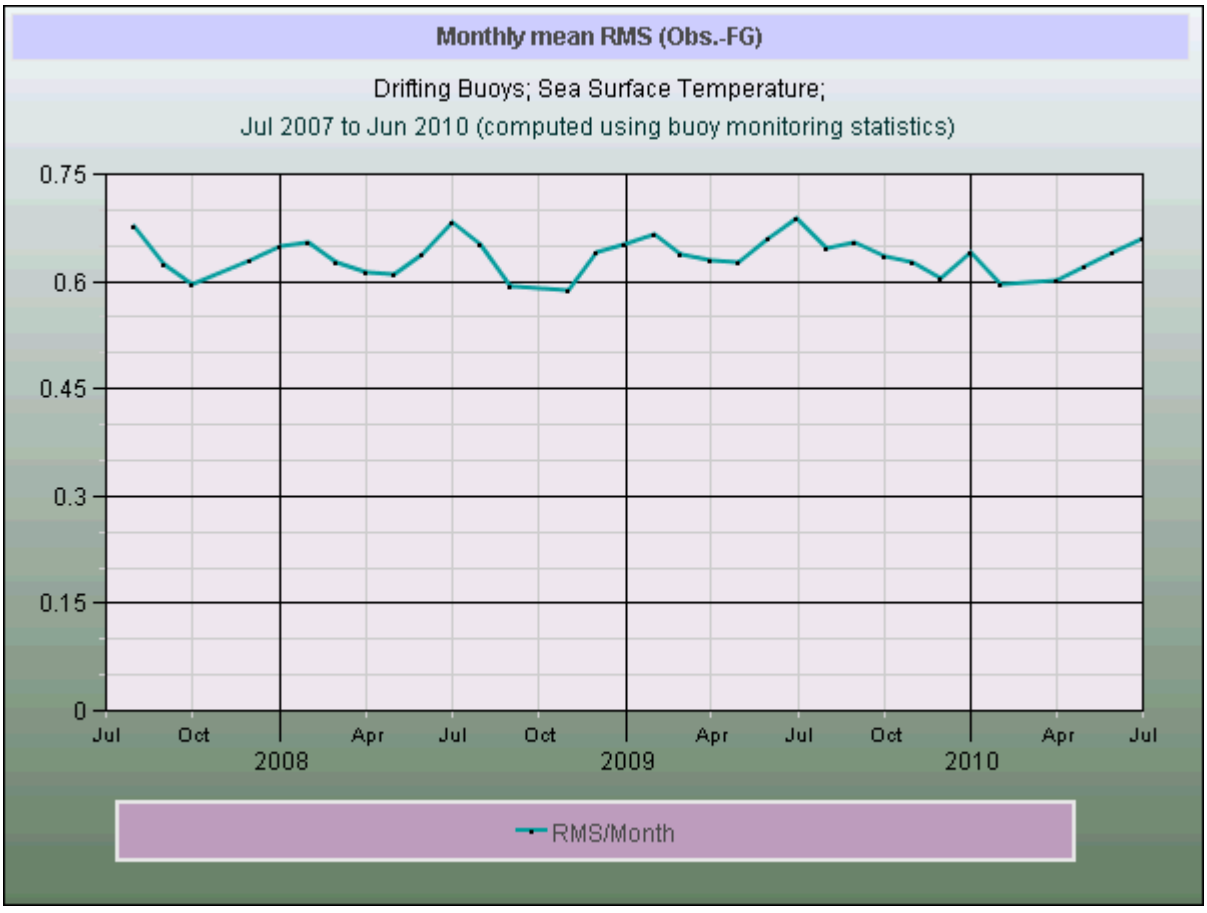


Figure 5b: Drifting buoy SST Quality Control (2007-2010)

3.4 The RMS (Obs.-FG) for drifting buoy SST data based on NCEP buoy monitoring statistics for the period July 2009 to June 2010 remained consistent with recent years at around 0.64 during the last year, though a clear seasonal signal can be seen if several years of RMS statistics are plotted (See figure 5b).

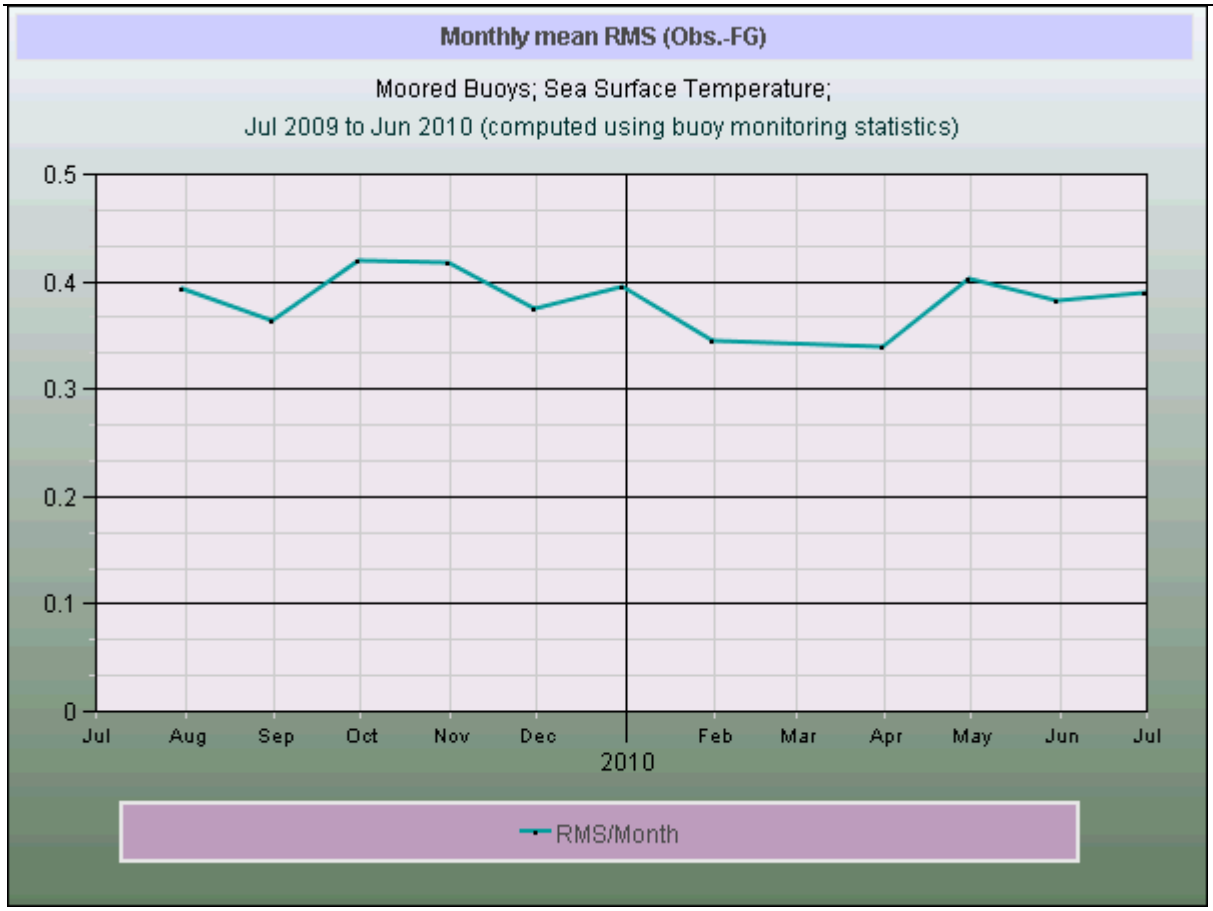


Figure 6 Moored buoy SST Quality Control

3.5 The RMS (Obs.-FG) for moored buoy SST data based on NCEP buoy monitoring statistics for the period July 2009 to June 2010 fluctuated in the last year but remained lower than a several years ago, averaging around 0.39.

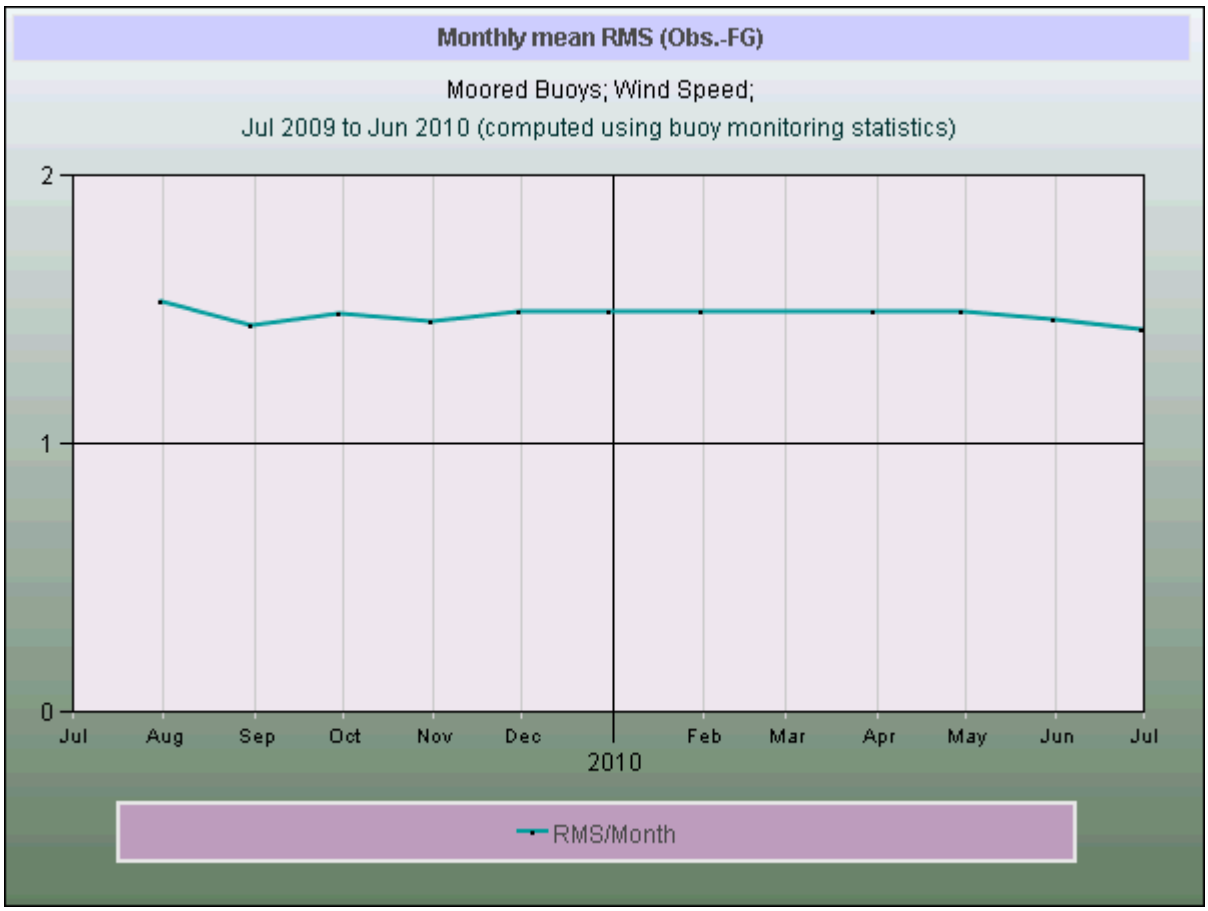


Figure 7: Moored buoy Wind Speed Quality Control

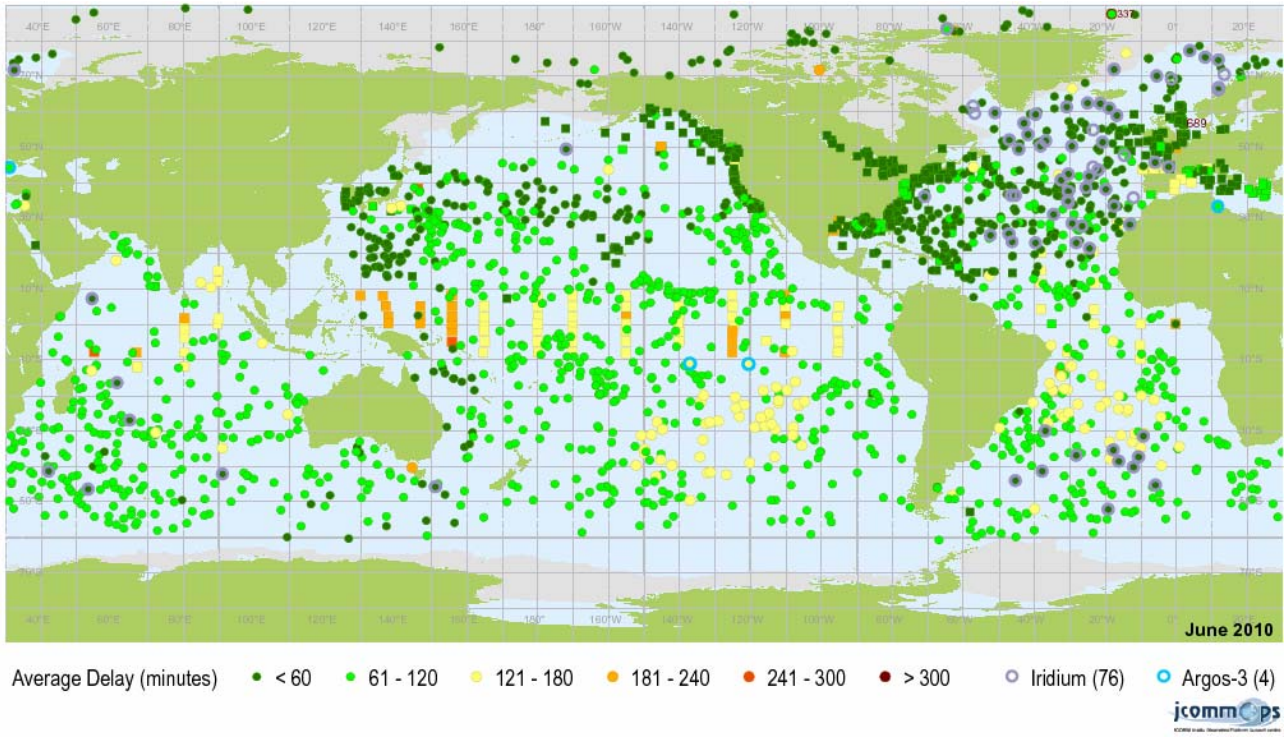
3.6 The evolution of mean RMS(Obs-FG) per month for Moored Buoys Wind Speed data (from ECMWF statistics) demonstrates that the agreement between buoys and the model has remained very steady ,after a significant drop last year.

4. Data timeliness

4.1 General timeliness review

- The JCOMMOPS maps, focusing on delays, were produced monthly and placed on the DBCP website[2]. They re reproduced in the Appendix. They show that during the last 12 months, the delays in the Central Indian and Pacific Oceans seem to have improved slightly, with nearly all drifting buoys in the Indian Ocean transmitting within 120 minutes (on average) during May and June 2010.
- On average there were improvements seen in the Pacific Ocean. For May and June the region experiencing delays of greater than 120 minutes became much smaller and restricted to an area between 150°W-100°W and the equator and -50°S. In the past these long delays were regularly experienced all the way to New Zealand and also with more frequency in the Northern and central Pacific.
- The delays in the Atlantic have remained the same for the last year, though a small improvement can be seen over recent months in the Central Atlantic

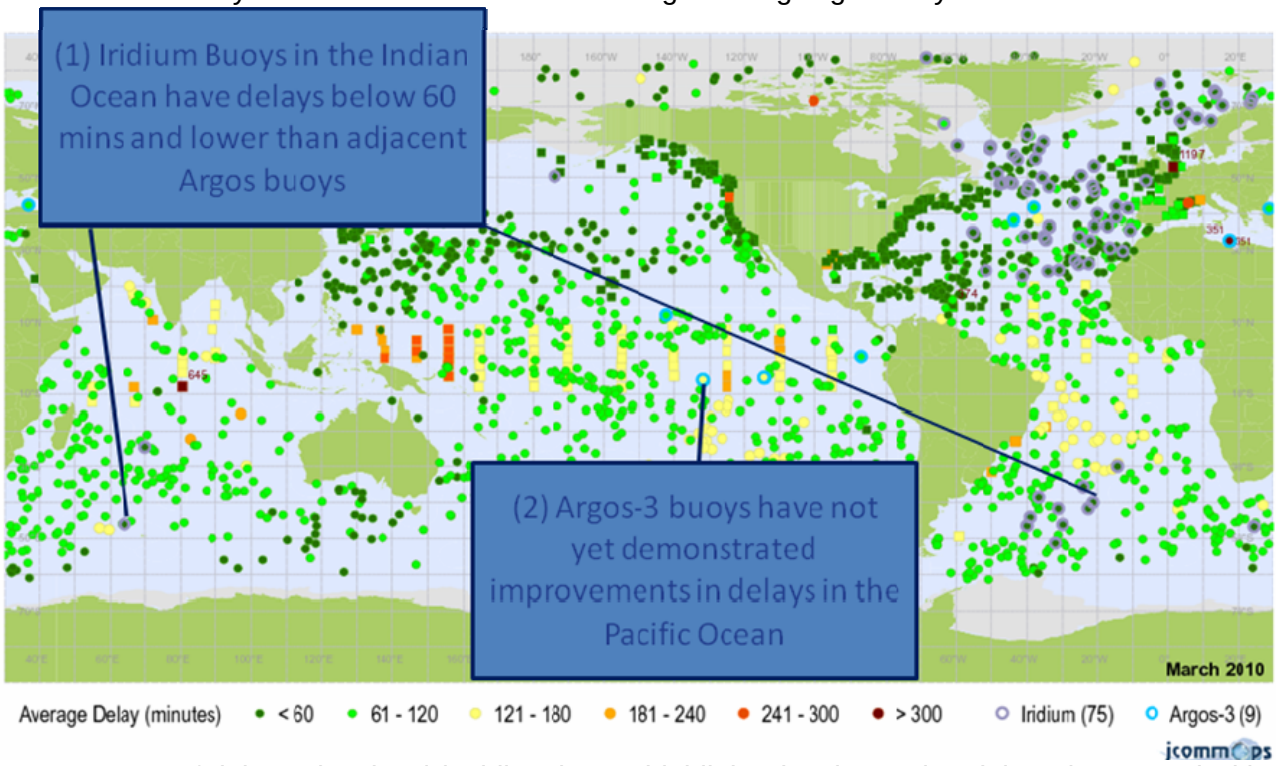
2 http://www.jcommops.org/dbcp/network/dbcpmaps.html



Map 4: Data timeliness (GTS reception – Obs time) map for June 2010

- Iridium Buoys continue to provide data within less than 60 minutes most of the time. Iridium Buoys in the Indian Ocean and are always lower than neighbouring Argos buoys.

- Argos-3 buoys have not yet shown an improvement for GTS delays, as evidence by the map for March 2010 in Map 5. The sample of Argos-3 buoys is not significant enough at this stage, but they have not yet demonstrated improvements in delays in the Pacific Ocean as the delays are sometimes worse than neighbouring Argos buoys.



Map 5: Map of delays showing (1) Iridium buoys highlighted as improving delays (compared with standard Argos buoys) in the Indian and Atlantic Oceans and (2) Argos-3 buoys showing the same

or worse timeliness than standard Argos buoys.

4.2 Argos antenna upgrades and Indian Ocean delays

- On the topic of improvements to the Argos System in the Indian Ocean, CLS reports that two actions are ongoing. The status is as follows:

(i.) A cooperation is being developed with EUMETSAT EARS (EUMETSAT Advanced Retransmission Service) for an HRPT antenna in Muscat, Oman. The antenna is already installed and validation tests are being done by EUMETSAT. This will improve the Argos data time availability in NE of Indian Ocean

(ii.) Within the project with CNES, in the upgrade of the existing real-time network (compatible with all Argos instruments) Hyderabad and La Réunion Island antennas have been selected for upgrade. A list of selected stations and expected improvements in the form of two graphics to show the improvements expected as part of this project, which will be for all ocean basins

a) The first phase of this project is finished (an Engineering and System study)

b) The second phase (Conception and Upgrade deployment) has started and will be achieved in 2011. More detail is given in DBCP 26 Document 10.3 Argos Operation and System improvements.

4.3 The Panel was very pleased in the expected improvements in the Central Pacific and the Indian Ocean, but noted that the upgrades were unlikely to improve the situation in the southern Atlantic or Western Pacific very much.

5. Map Products

5.1 Dynamic maps:

Monthly:

- Maintained monthly dynamic map: http://w4.jcommops.org/WebSite/DBCP
- Google Earth Monthly DBCP Map http://www.jcommops.org/FTPRoot/DBCP/status/DBCP.KMZ
- JCOMMOPS Maintains a dynamic map of all JCOMM observing systems http://w4.jcommops.org/WebSite/JCOMM

Daily:

- Maintained daily dynamic map (drifter trajectories): http://w4.jcommops.org/WebSite/DBCP_RT
- Google Earth Daily DBCP MAP http://www.jcommops.org/FTPRoot/DBCP/status/dbcp_daily.kmz

5.2 Static maps:

- DBCP

The DBCP maps produced by the Technical Coordinator were consolidated into one web page, for maps going back to the start of 2007. http://www.jcommops.org/dbcp/dbcpmaps.html,

PDF and PNG Files are also accessible directly from
http://www.jcommops.org/FTPRoot/DBCP/Maps/2010/, which includes
- Buoys by Country

- Barometer Drifting Buoys by Country
- SST, Barometer, Wind and Wave Buoys (All Sensors)
- GTS Delays
- Iridium and Argos-3 Buoys by Country

- JCOMM

PDF and PNG Files are accessible directly from
http://www.jcommops.org/FTPRoot/JCOMM/Maps/

- All in situ marine observations:
  http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=GTSM_FMT
- Sub-surface salinity and temperature profiles (now included in a single map):
  http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=GTSM_SZ
- All Floats, Drifting and Moored Buoys:
  http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=BUOYS
- All Floats, Drifting and Moored Buoys - Polar areas:
  http://wo.jcommops.org/cgi-bin/WebObjects/JCOMMOPS.woa/wa/map?type=BUOYS_POLES

- OceanSITES

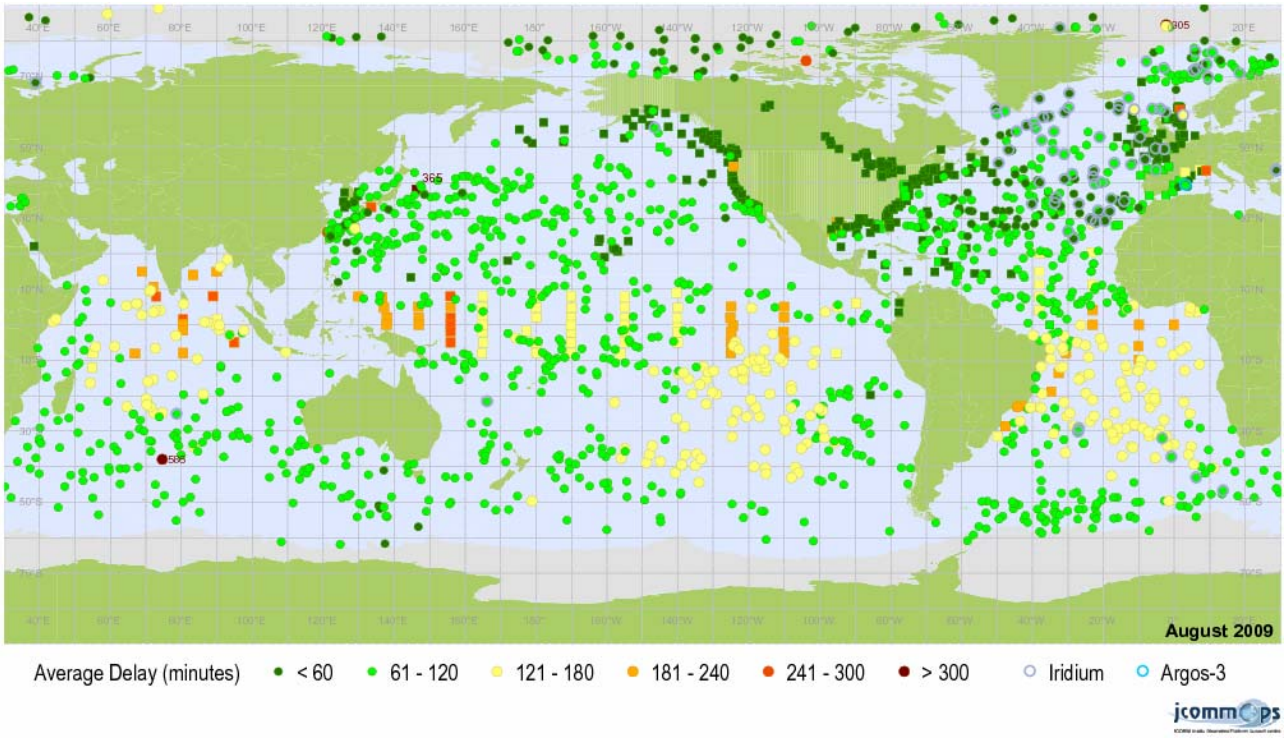
PDF and PNG Files are also directly accessible from http://www.jcommops.org/FTPRoot/OceanSITES/maps/, which includes:
- OceanSITES platforms sharing data on the GTS (Produced Monthly):
  e.g. http://www.jcommops.org/FTPRoot/OceanSITES/maps/2010/201006-OCEANSITES-GTS.png
- OceanSITES platforms sharing data on the Global Data Assembly Centres (Produced Quarterly):
  e.g. http://www.jcommops.org/FTPRoot/OceanSITES/maps/2010/201005-OCEANSITES-GDAC-blueocean.png
- All active and current sites:
  http://www.jcommops.org/FTPRoot/OceanSITES/maps/200908_CURRENT.pdf
- Google Earth File:
  http://www.jcommops.org/FTPRoot/OceanSITES/status/200908_oceansites_locations.kmz
- All planned and discontinued sites:
  http://www.jcommops.org/FTPRoot/OceanSITES/maps/200908_VISION.pdf

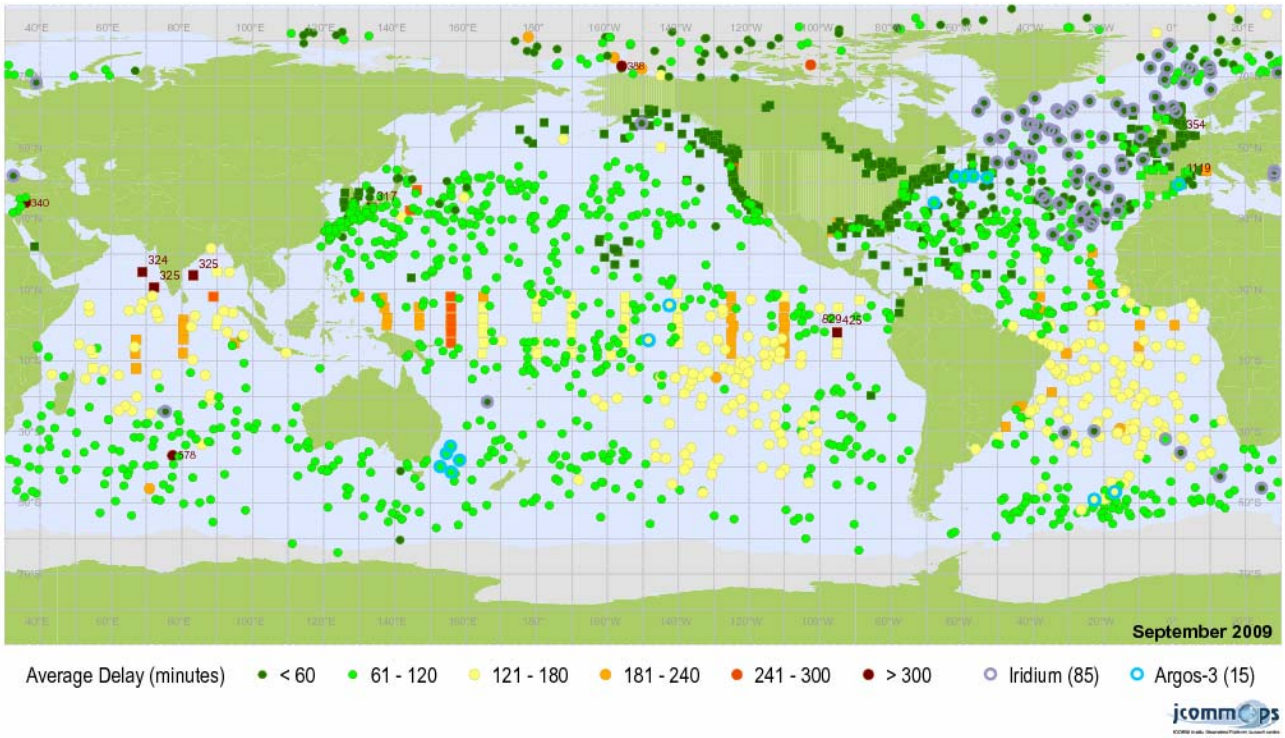
APPENDIX

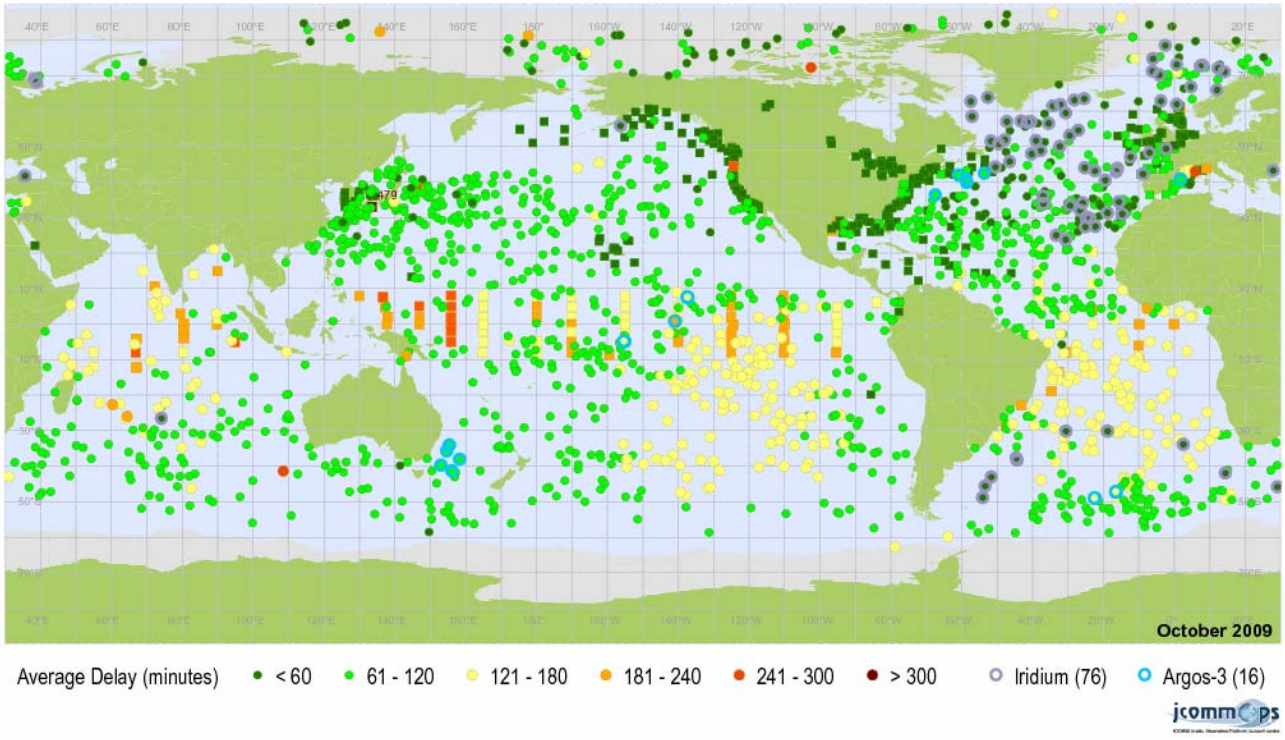
GTS DELAY MAPS 2009-2010

The maps below show the evolution of data timeliness in all ocean basins during the period 2009 to 2010. These maps, including more recent ones, can also be displayed from the JCOMMOPS web site at:

http://www.jcommops.org/dbcp/dbcpmaps.html (-> GTS Delays)







Average Delay (minutes) • < 60 • 61 - 120 • 121 - 180 • 181 - 240 • 241 - 300 • > 300 ○ Iridium (76) ○ Argos-3 (16)

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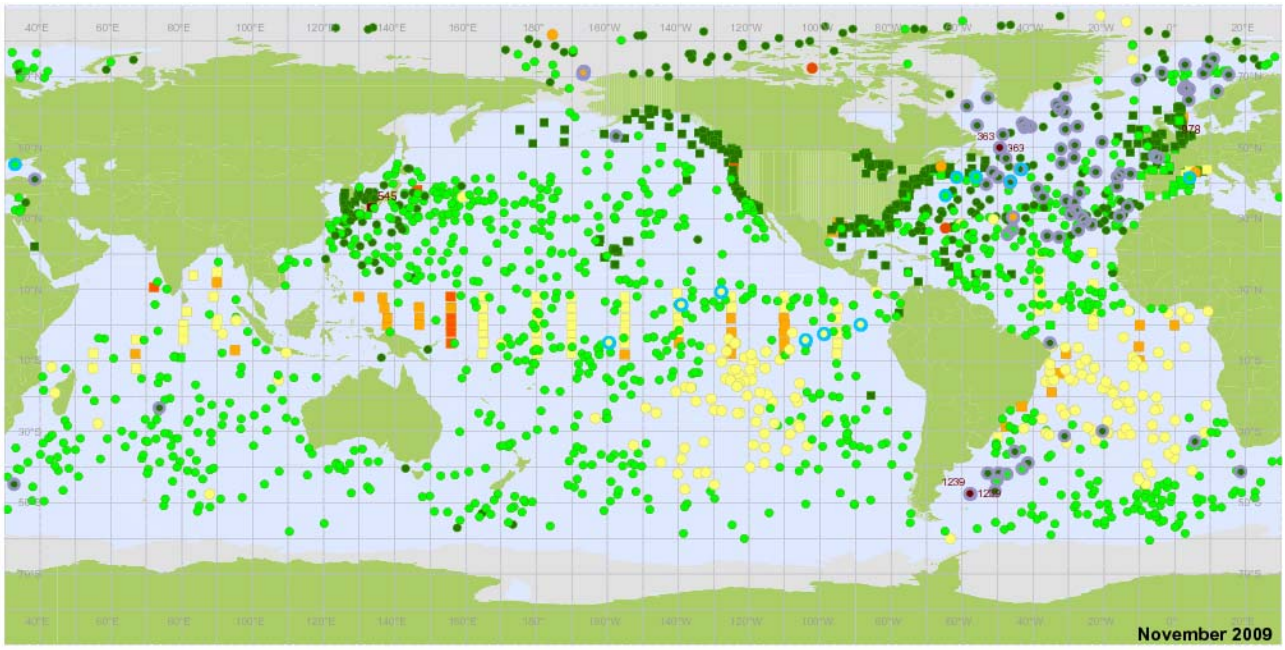
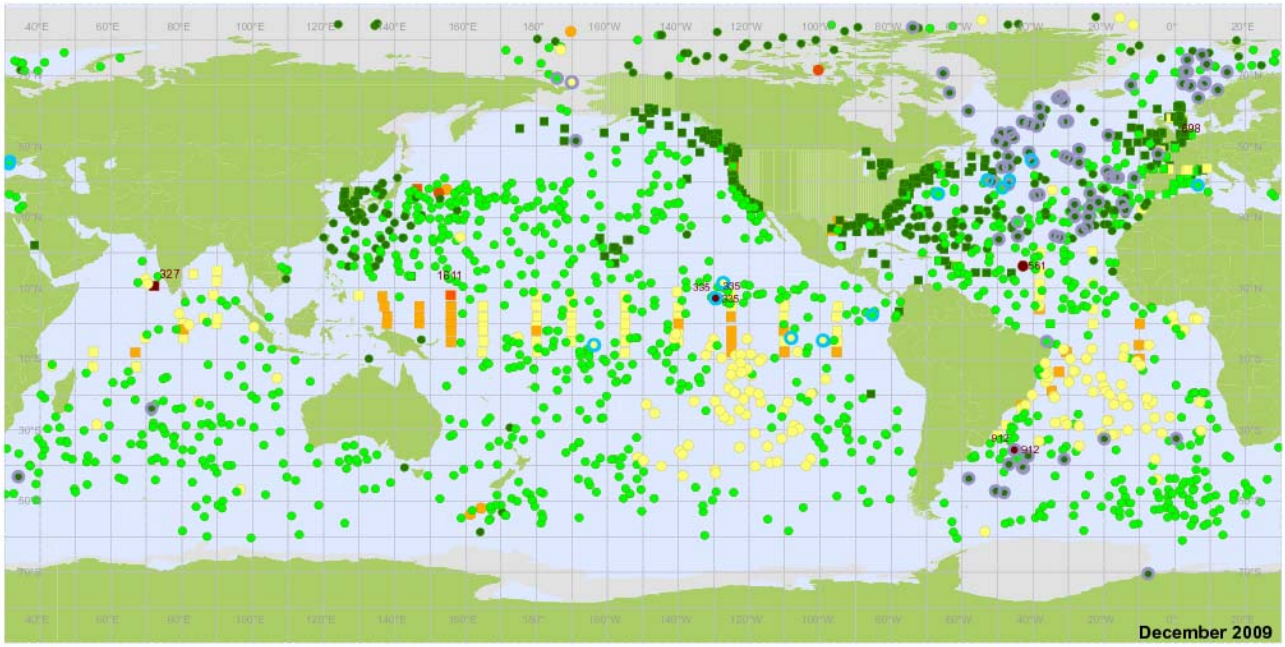
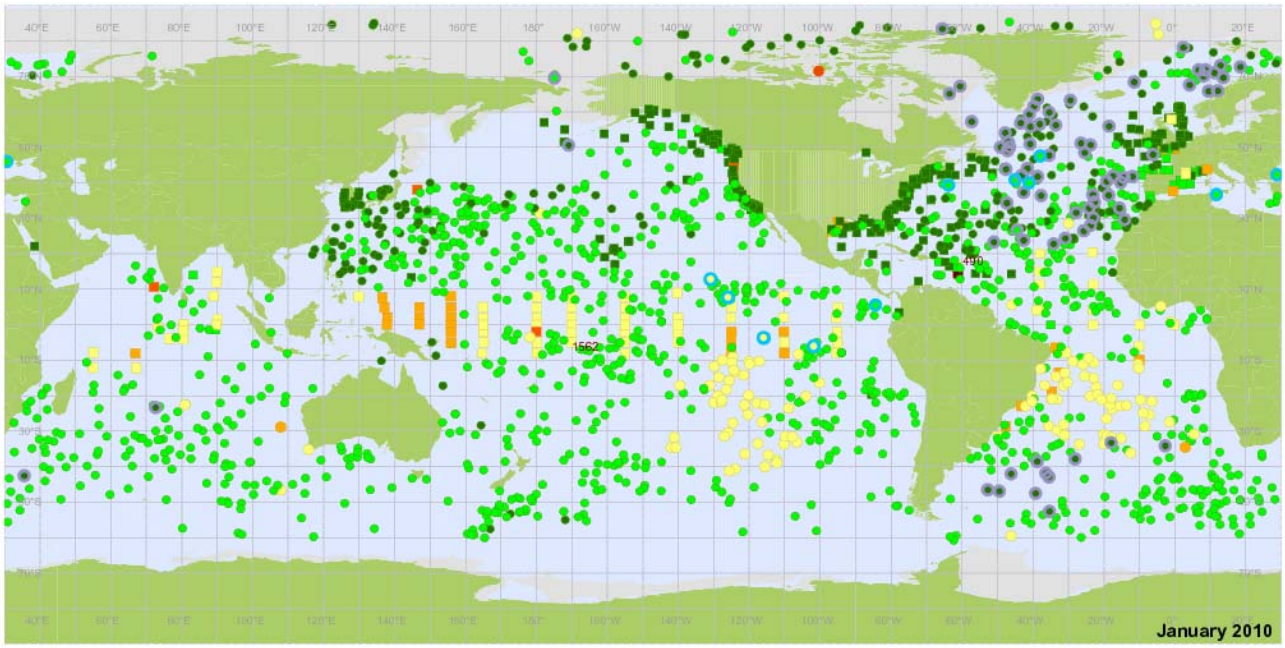
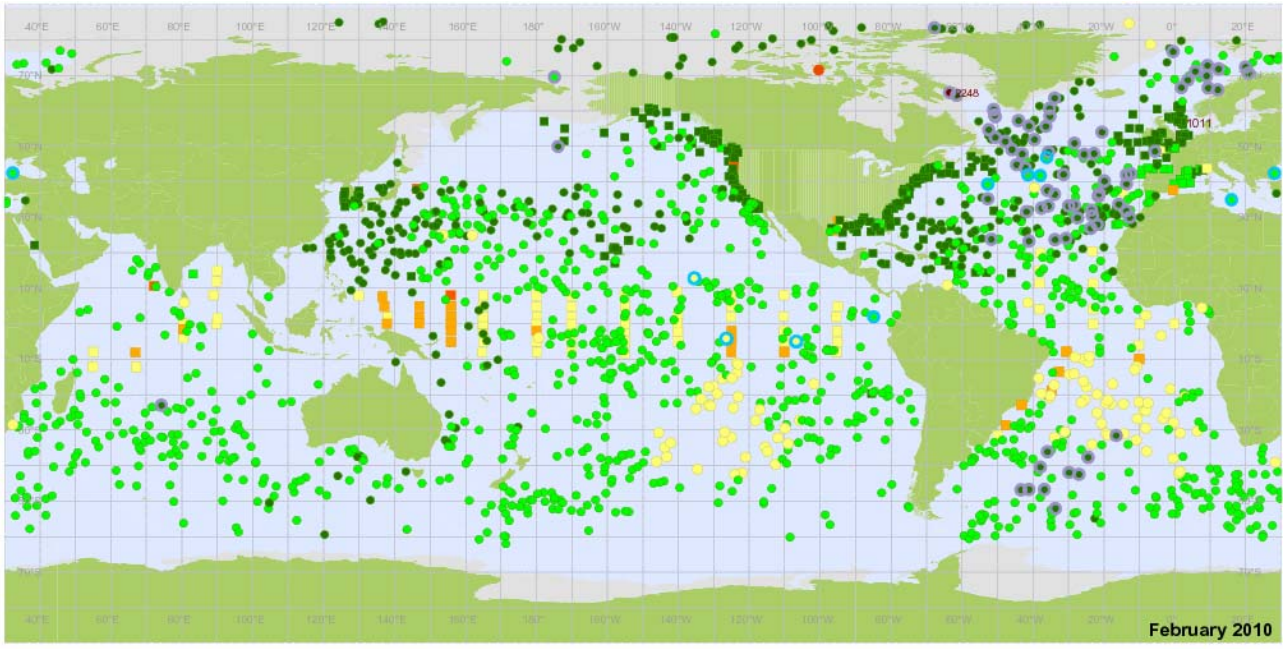


Average Delay (minutes) • < 60 • 61 - 120 • 121 - 180 • 181 - 240 • 241 - 300 • > 300 ○ Iridium (84) ○ Argos-3 (14)

jcommops

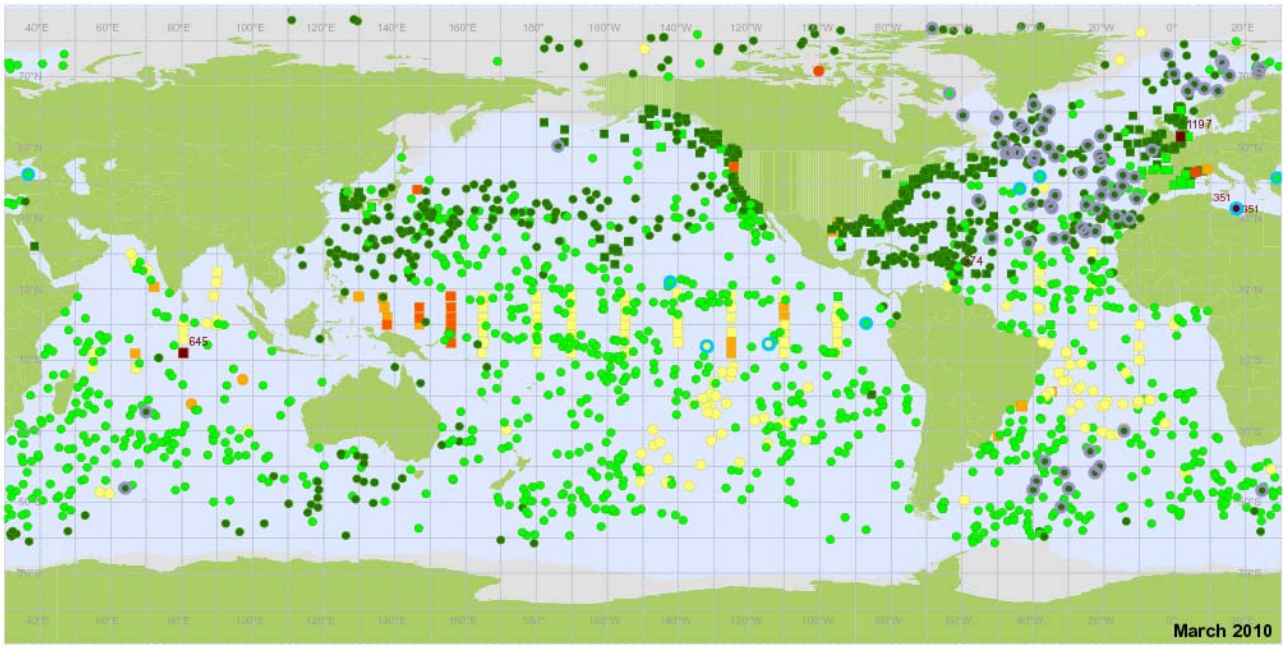

December 2009
Average Delay (minutes)
< 60
61 - 120
121 - 180
181 - 240
241 - 300
> 300
Iridium (85)
Argos-3 (14)
jcommops


January 2010
Average Delay (minutes)
< 60
61 - 120
121 - 180
181 - 240
241 - 300
> 300
Iridium (79)
Argos-3 (12)
jcommops



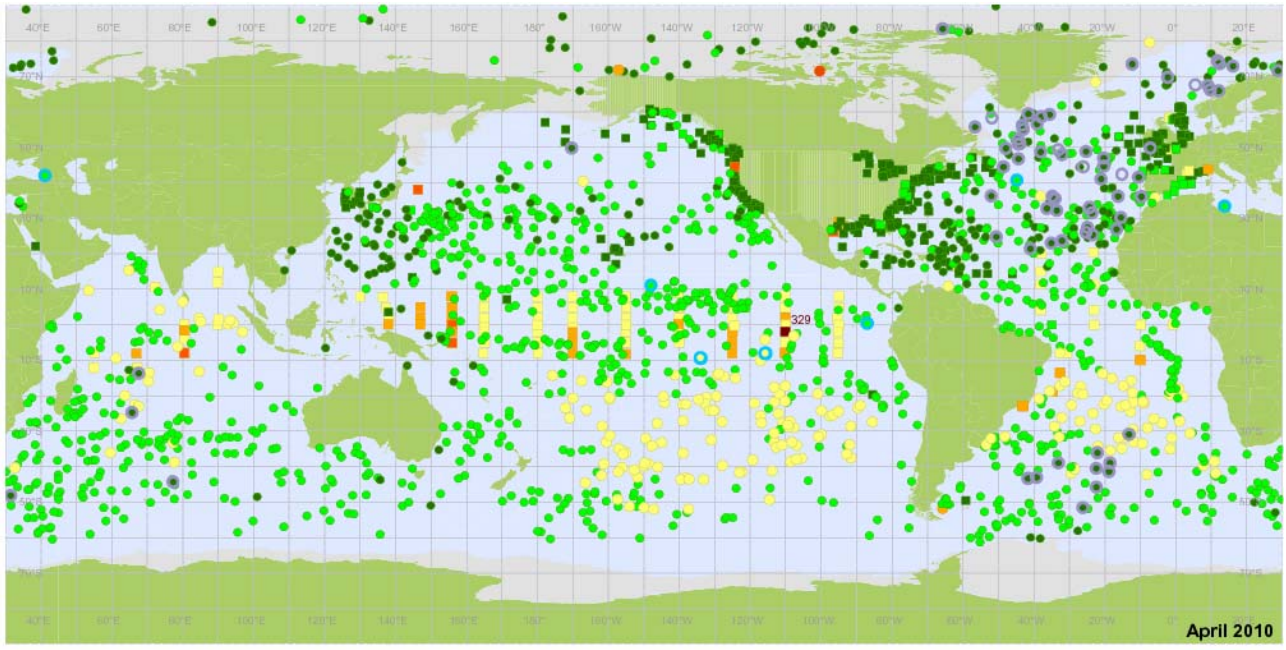
Average Delay (minutes) • < 60 • 61 - 120 • 121 - 180 • 181 - 240 • 241 - 300 • > 300 ○ Iridium (77) ○ Argos-3 (11)

jcommops



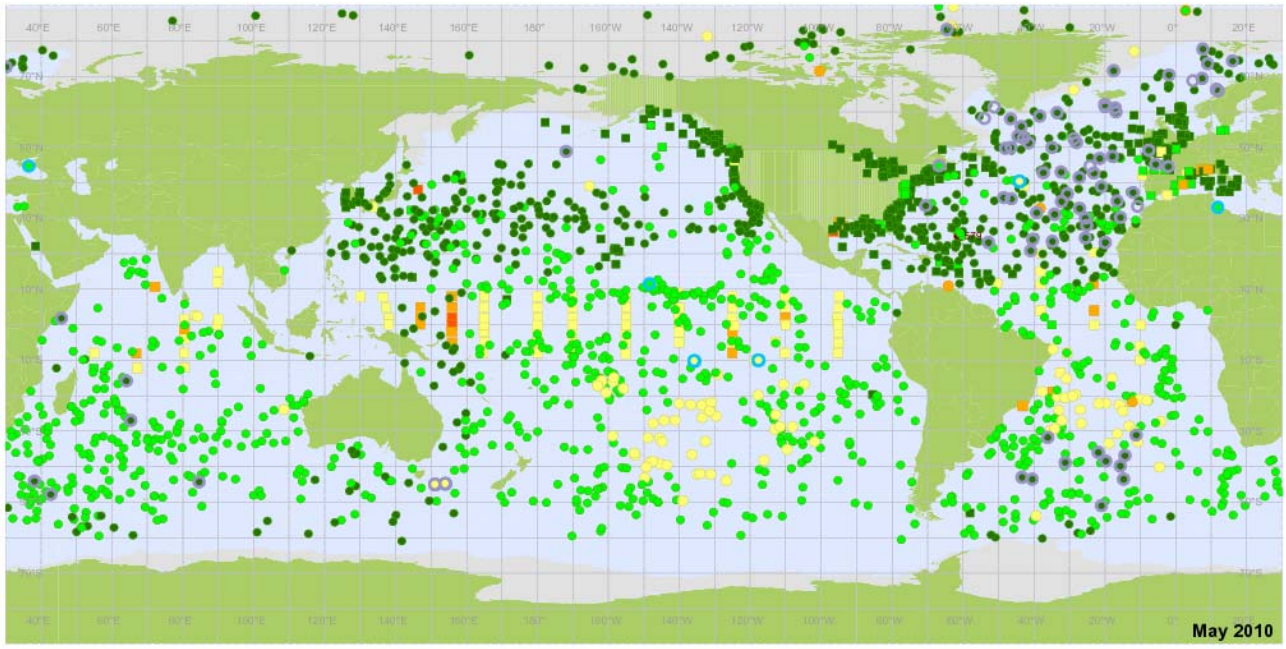
Average Delay (minutes) • < 60 • 61 - 120 • 121 - 180 • 181 - 240 • 241 - 300 • > 300 ○ Iridium (75) ○ Argos-3 (9)

jcommops



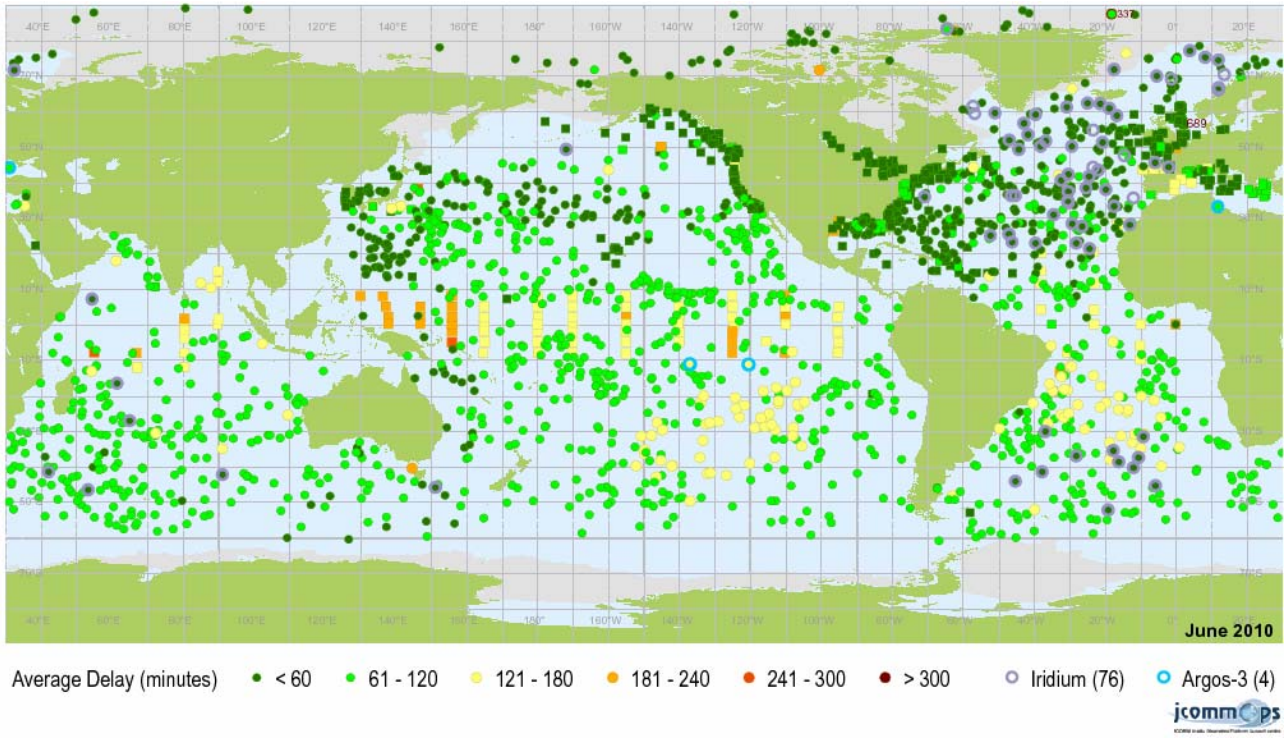
Average Delay (minutes) • < 60 • 61 - 120 • 121 - 180 • 181 - 240 • 241 - 300 • > 300 ○ Iridium (69) ○ Argos-3 (7)

jcommops



Average Delay (minutes) • < 60 • 61 - 120 • 121 - 180 • 181 - 240 • 241 - 300 • > 300 ○ Iridium (81) ○ Argos-3 (6)

jcommops


June 2010
Average Delay (minutes)
< 60
61 - 120
121 - 180
181 - 240
241 - 300
> 300
Iridium (76)
Argos-3 (4)
jcommops