Review of Investigations in 2010-2011 to Progress Drifter Technology

(All data were fixed on 15 Sep 2011)

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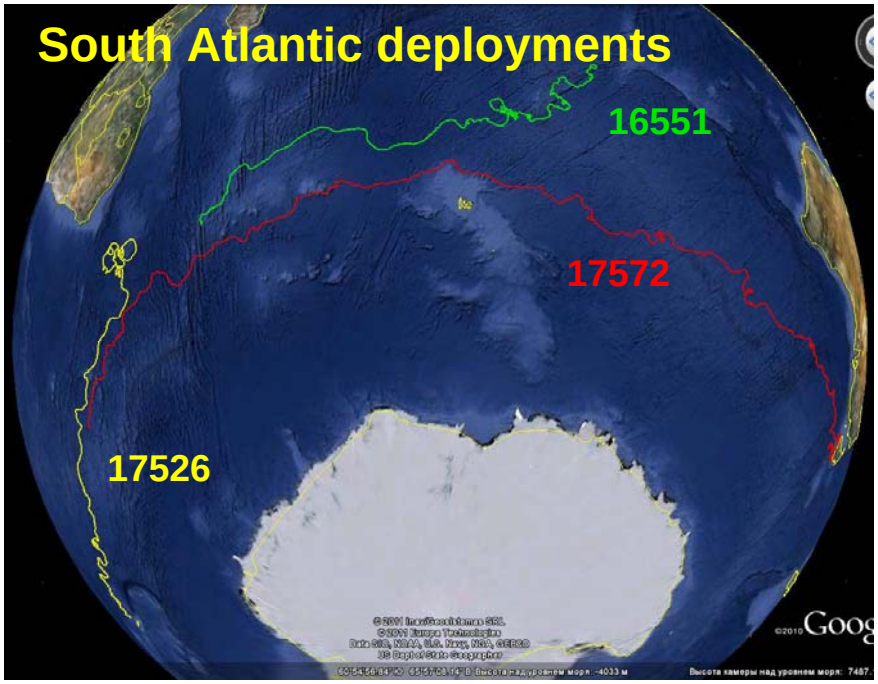
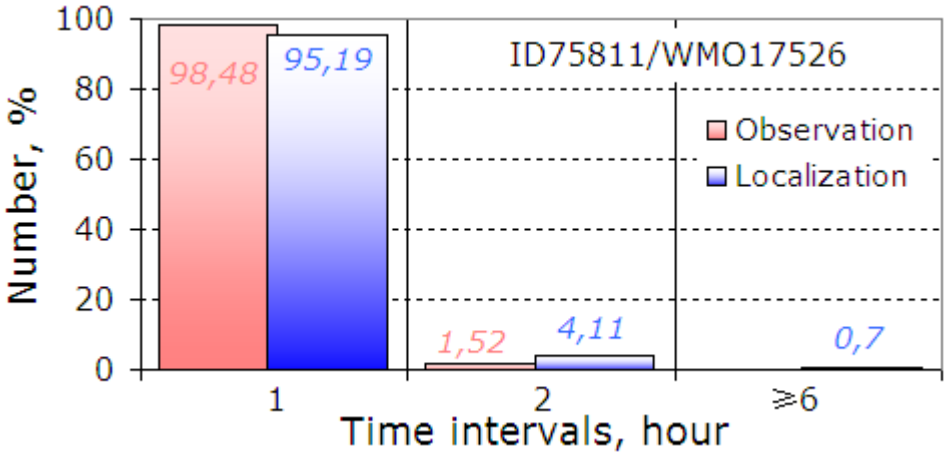
Evaluation of the Iridium PP drifters, deployed by SAWS in South Atlantic

Information about the buoys						Status of sensors			
Owner	WMO	GPS	Deployment	Days	Theor	GPS	SST	SLP	Drog
SAWS	17572	No	15 Dec 2009	639	900	no	+	+	124
	17526	Hourly fixes	25 Jan 2010	598	750	+	+	+	562
	16551		13 Apr 2010	520		+	+	+	122



Continuity of hourly samples and GPS fixes under any weather

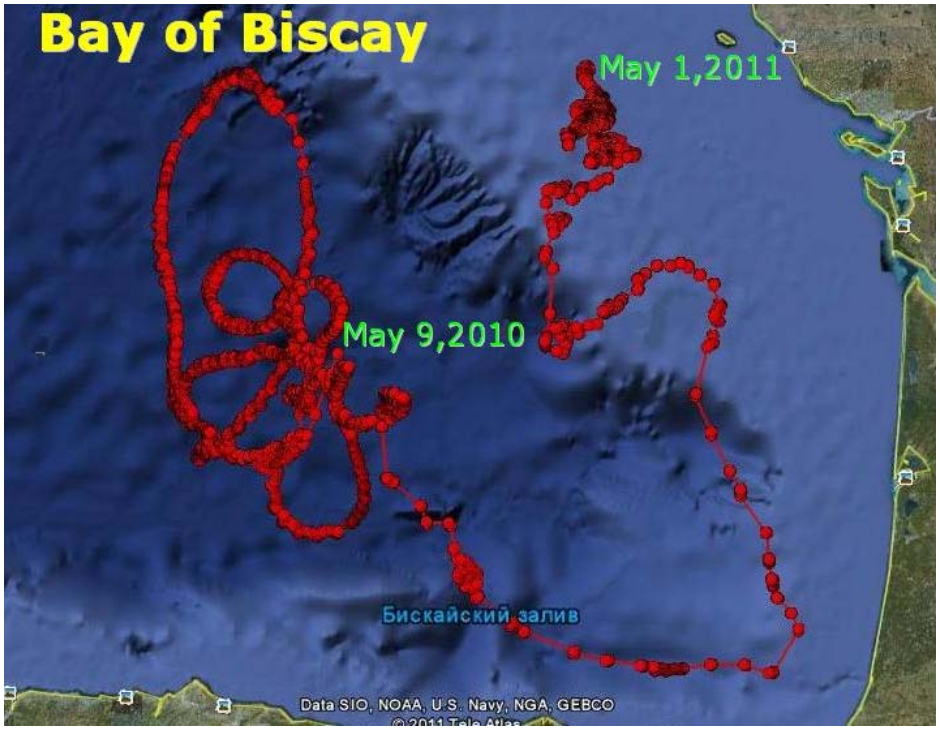


Evaluation of Iridium SVP-BTC80 temperature-profiling drifter (1 year in the Bay of Biscay)

Information about the buoy							Status of sensors					
Owner	WMO	GPS	Depl.	Recov.	Days	Theo	GPS	SST	SLP	Tz (16)	Drog	HP
Met-Fr	62510	hourly	1 May 10	9 May 11	357	420	+	+	+	+	+	8th month

The buoy was recovered to study the problem with HP sensor

Full trajectory



After recovery

Evaluation of Iridium SVP-BTC80 temperature-profiling drifter: quality control

METEO FRANCE - Thermistor String Data 6200510 : 2010/12 - Opera

www.meteo.shom.fr/qctools/svp_odv/6200510_2010_.html

METEO FRANCE
Toujours un temps d'avance

THERMISTOR STRING BUOYS DATA

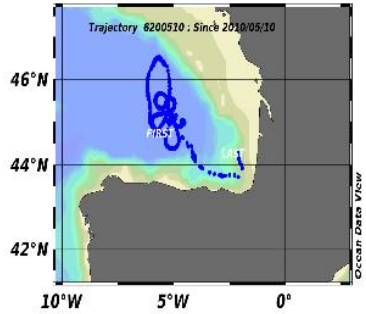
METEO FRANCE : Quality Control Tools : Thermistor String Buoys data

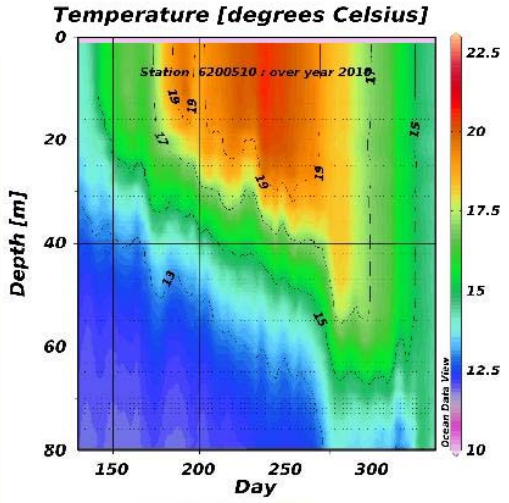
BUOY 6200510 : Trajectory and Temperature in depth for the year 2010 and zoom on the last 30 days for available data.

On the trajectory map , 'First' annotation indicates the first postion of the buoy for the analysed period and 'Last' annotation indicates the last position recorded when update was performed.

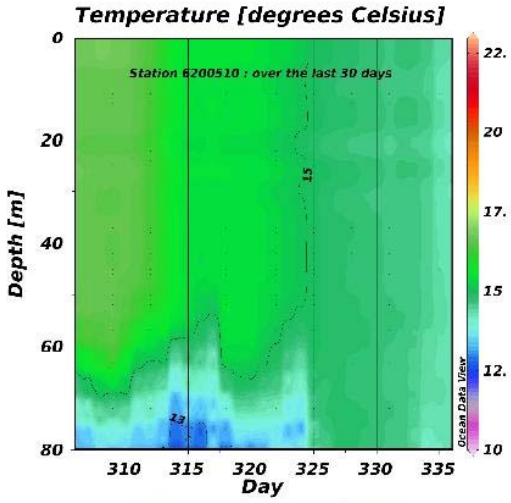
All graphs are produced through ODV application.

Last update : 2010/12/2 15:08





Data since 2010/05/10



Zoom on data for the last 30 days

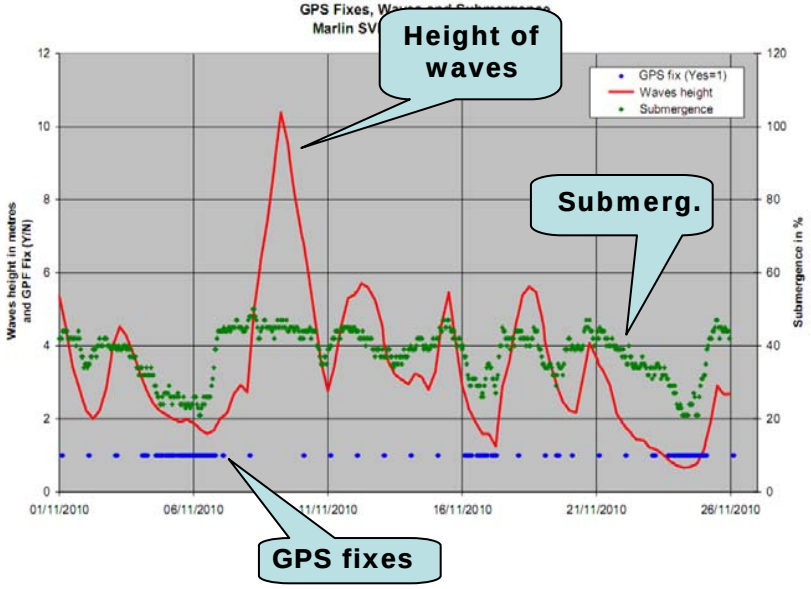
WEB Designed by Jean-Pierre KERSERHO - Meteo France - Aout 2010 Any comments

Меню | METEO FRANCE - Therm...

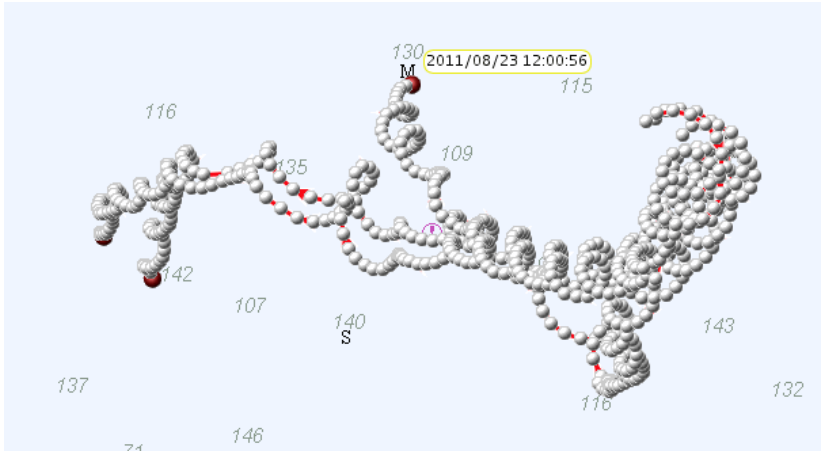
GPS capabilities under different waves conditions

Owner	Buoy	WMO	Link	Depl.	Area	Wave infl. on GPS fixes	
						Duty cycle GPS	Continuous GPS
SAWS	SVP-B	62510	Iridium	9 May 10	South Ocean	Any	
Met-Fr	SVP-BTC	62510	Iridium	9 May 10	Bay of Biscay	3-m height	6-m height
Sweden	SVP-B mini	no	Argos-2	10 Aug 11	Baltic Sea	2-m height	4-m height

Iridium SVP-BTC/RTC/GPS
Bay of Biscay, Dec 2010



Argos-2 SVP-B/RTC/GPS mini
Baltic Sea, Aug 2011

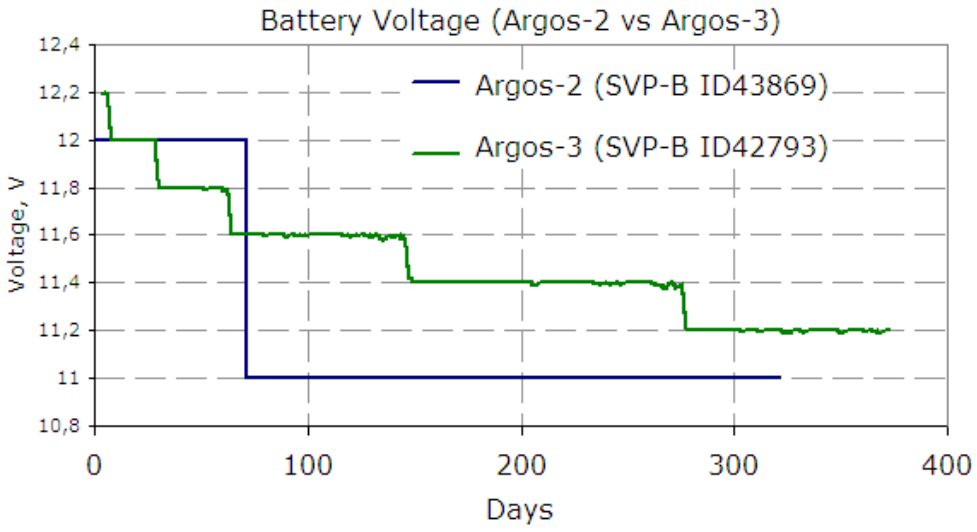


Graph from Pierre Blouch

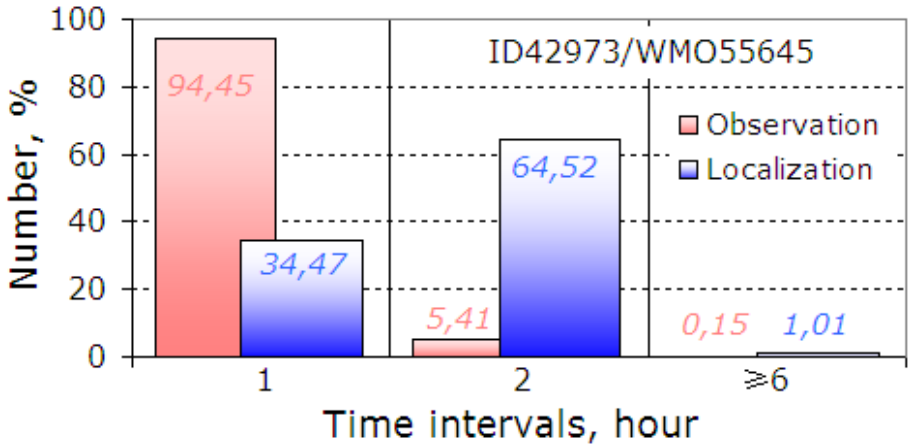
Evaluation of the Argos-3 PP SVP-B mini drifters in the Tasman Sea

Information about the buoys							Status of sensors		
Owner	ID	WMO	Depl.	Stop	Days	Theor.	SST	*SLP	Drog
CLS Argos ==== NZ MO	41803	55962	30 Sep 10		350	700	+	+	149
	41882	55963	1 Oct 10	beached re-depl	288		+	+	3
	42957	55961	31 Oct 10		318		+	+	144
	42961	55644	2 Sep 10		377		+	+	185
	42973	55645	2 Sep 10		377		+	+	326

The AP spikes took place after loss of drogue

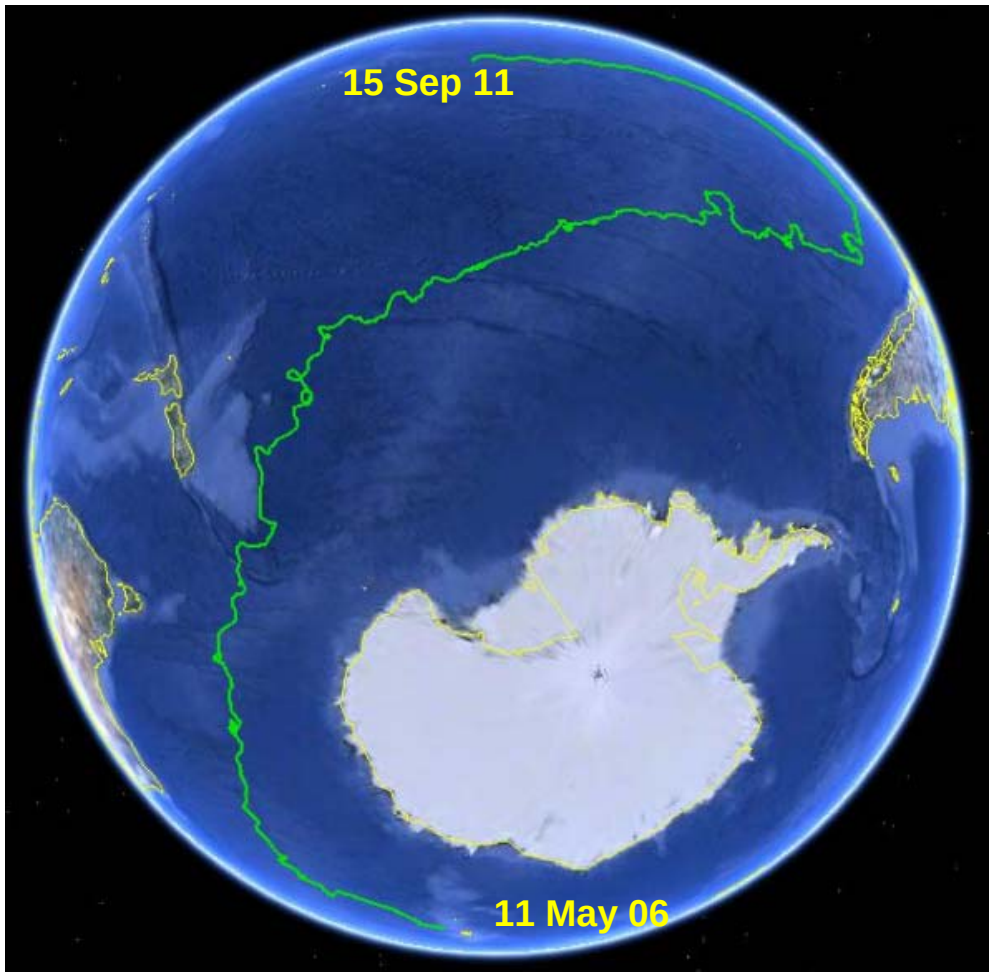


Continuity of hourly samples and Doppler fixes under any weather



Capabilities of Argos-2 drifters for tracking their trajectories

SVP-B drifter
1953-day track

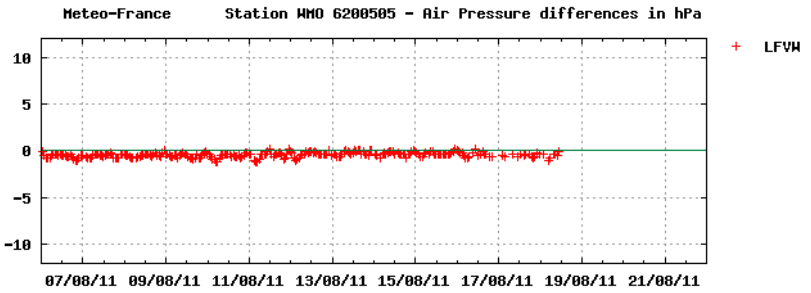


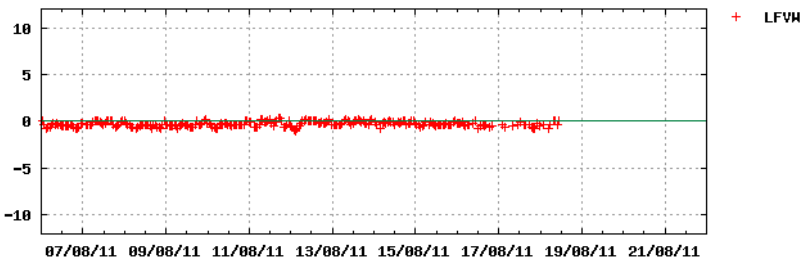
Duration of tracking				
Owner	ID	WMO	Depl.	Days
AUBOM	67381	56531	11.05.06	1953
	67379	56532	06.12.06	1744
	34127	56547	19.02.08	1304

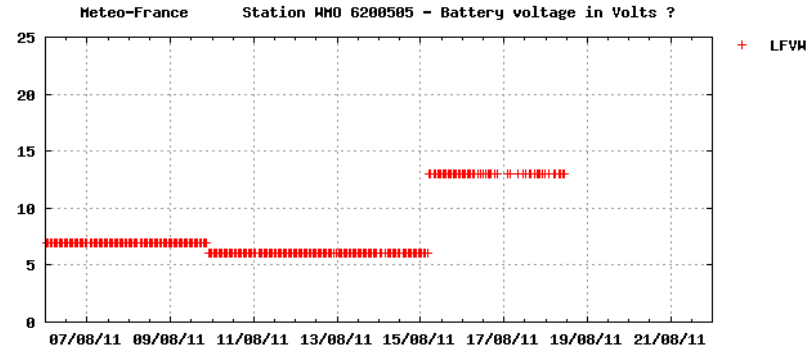
Quality of AP samples for 41-cm SVP-B standard drifter

Information about AP long-living SVP-B drifters						
Owner	ID	WMO	Depl.	Stop	Days	AP
Met-Fr	49678	62505	15 Jun 08	18 Aug 11	1159	+
AUBOM	84146	56939	25 Dec 08		1025	+
	84147	56943	4 Jan 09	15 Aug 11	953	+
	84152	56941	13 Jan 09	19 Aug 11	948	+

AP quality for WMO62505 on 1159 day



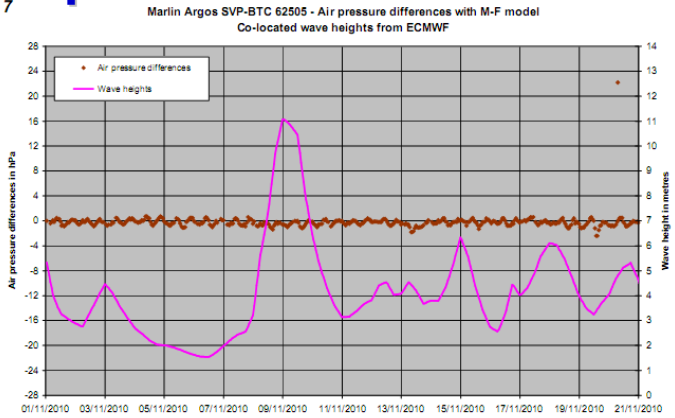




Graphs from Pierre Blouch

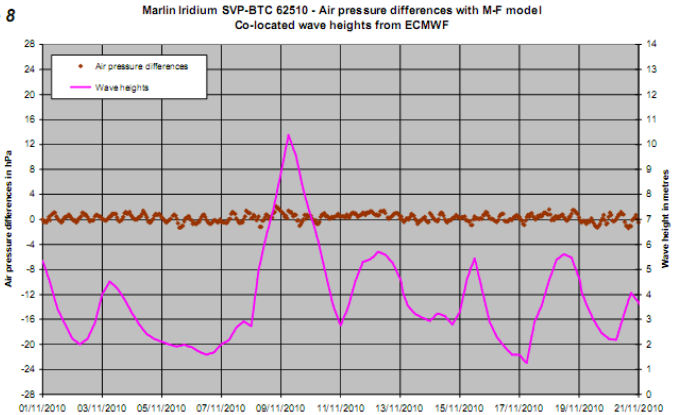
WMO62505 without drogue

Figure 7



WMO62510 with drogue and temperature chain

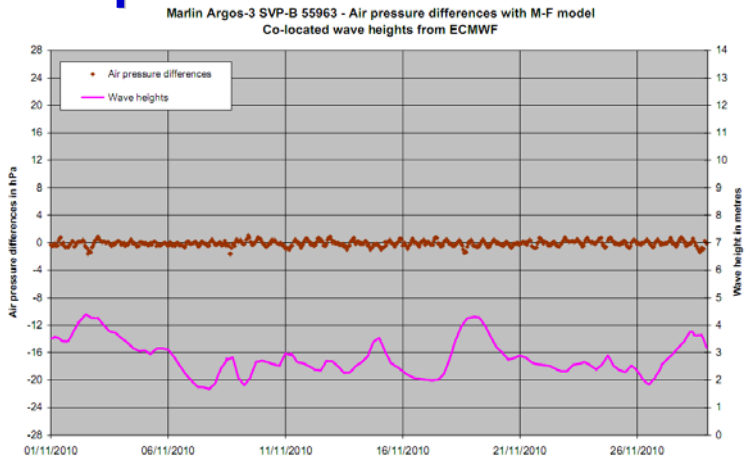
Figure 8



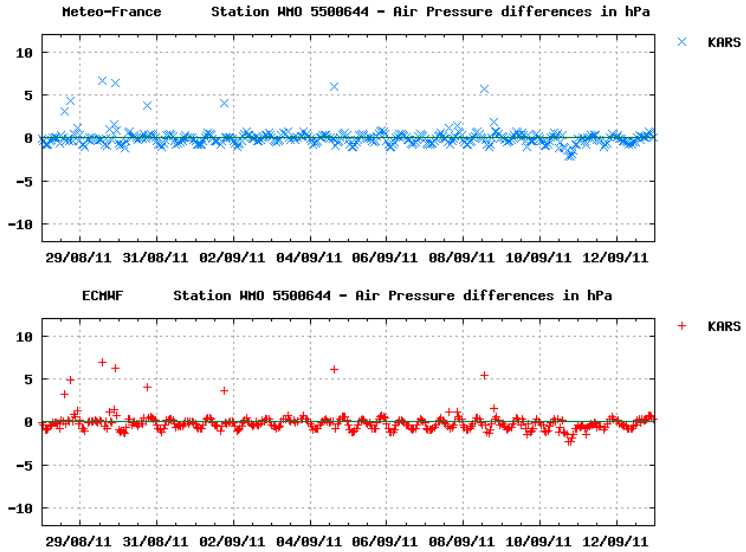
Quality of AP samples for 35-cm SVP-B mini drifter in the Tasman Sea

AP quality for buoy with drogue or when calm water without drogue

Graph from Pierre Blouch

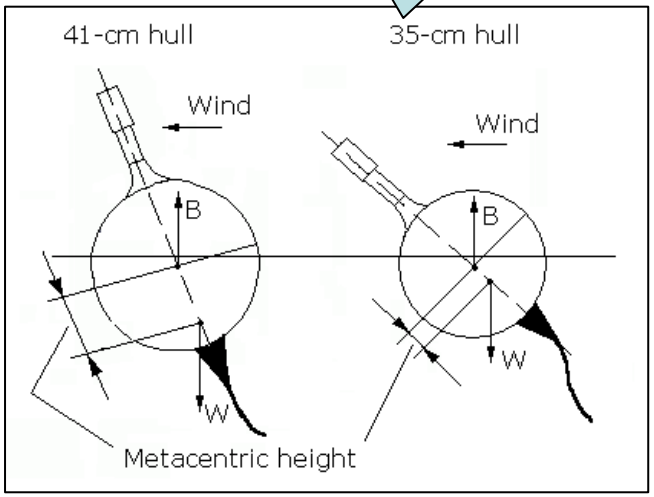


AP quality for buoy without drogue when harsh weather conditions



Reasons for AP wrong data

1. Larger inclination from vertical line because of smaller metacentric height.
2. Direct influence of wind on AP sensor.
3. The de-spiking algorithm cannot help



Keeping of the drogue attached

SVP-BTC drifter recovered after 1-year operation in the Bay of Biscay

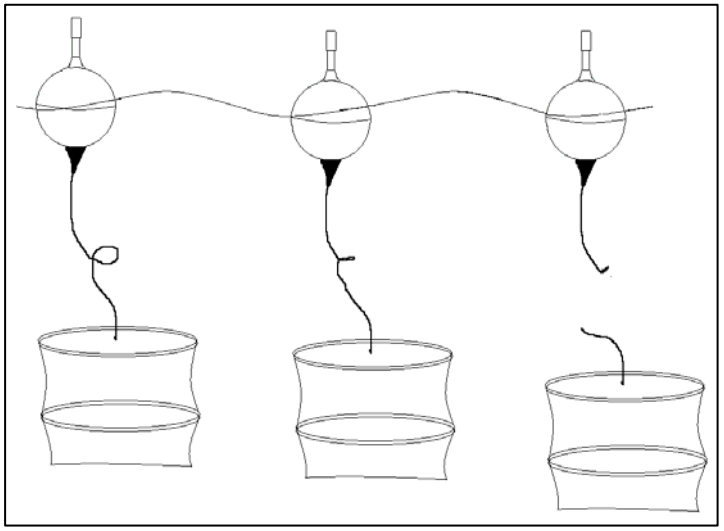
Tether inside hose

"Wire" connection

Drogue as a whole

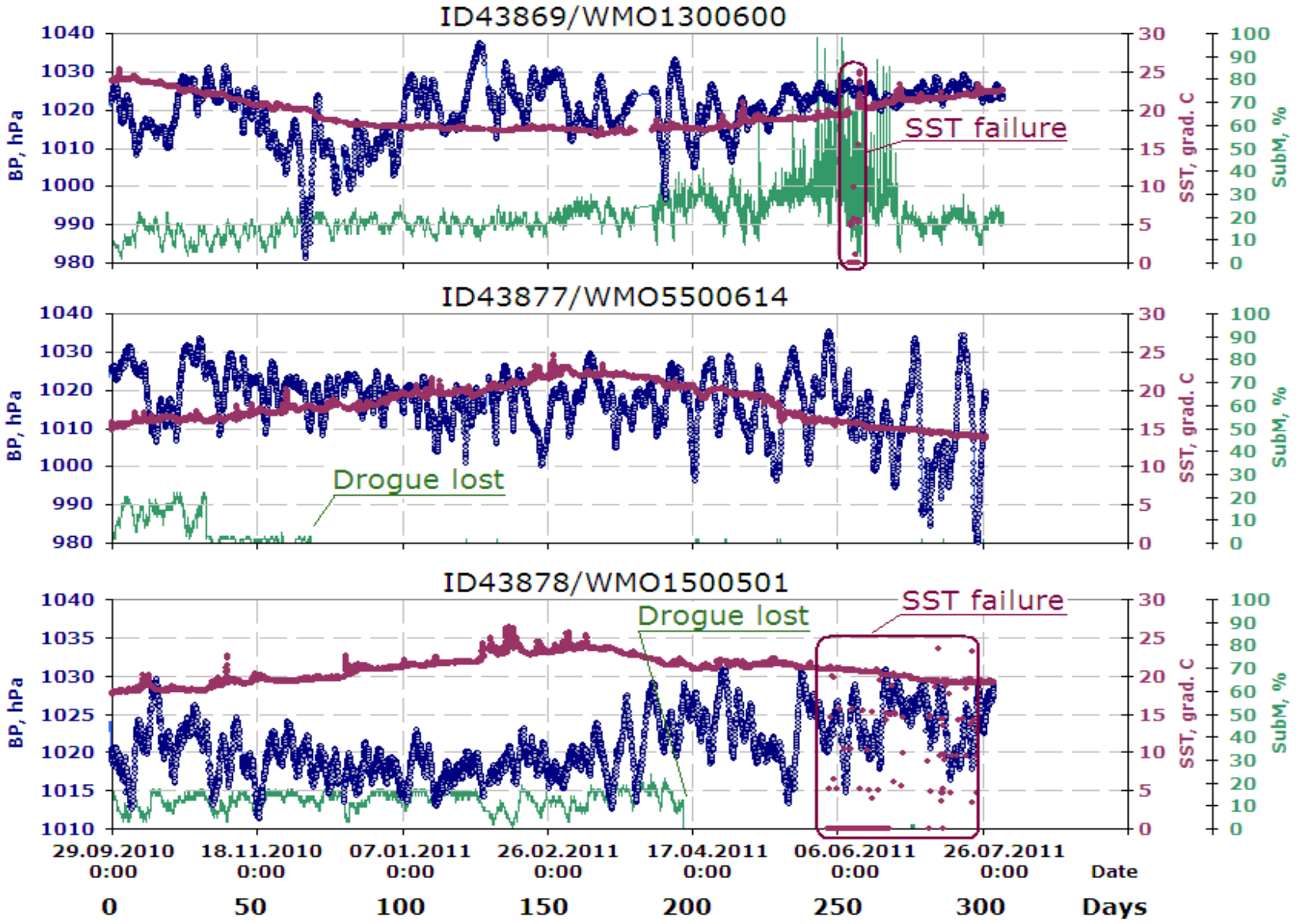
Reason to get the drogue lost

Loop at tether



NOAA test. 5 Argos-2 SVP-B/RTC drifters (Marlin-Yug)

Date: 28-Sep-2010 to 15-Aug-2011

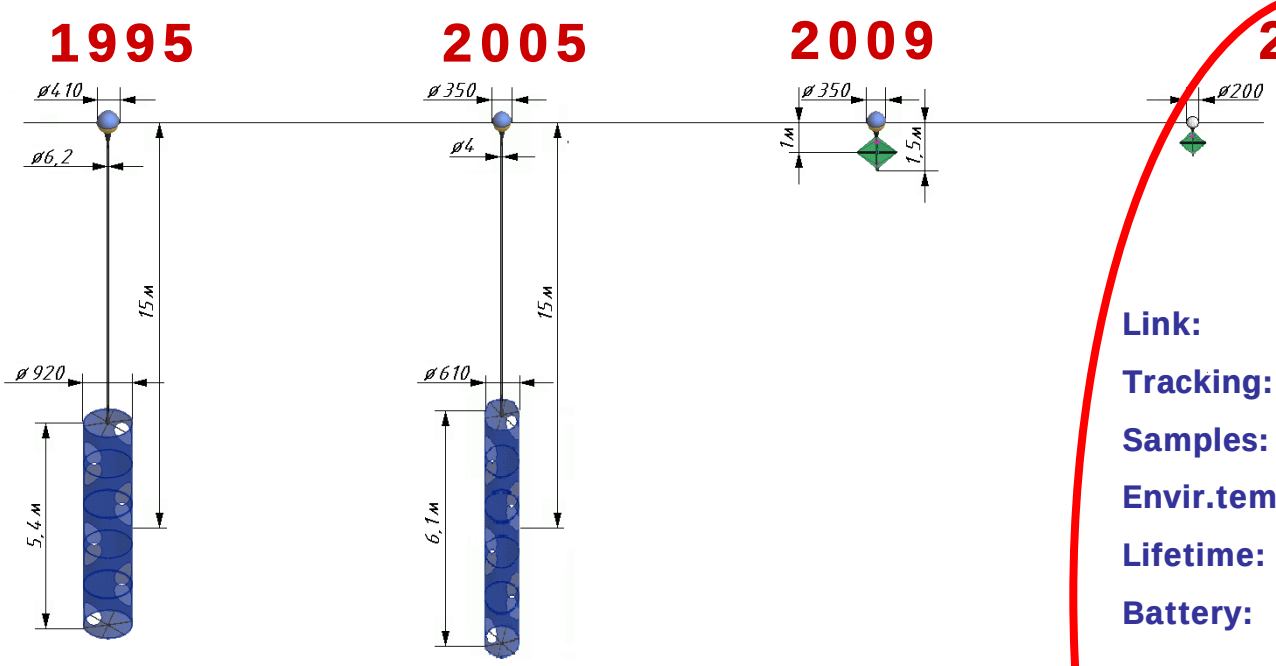


NOAA test. 5 Argos-2 SVP-B/RTC drifters (Marlin-Yug)

Date: 28-Sep-2010 to 15-Aug-2011

ID/ WMO	AP	SST	Drogue	Probable cause of failure
43868/ —	Deployment failure			no automatic switch
43869/ 1300600	ok	failure after 255 days	ok	SST: sensor connection failure
43870/ —	Deployment failure			no automatic switch
43877/ 5500614	ok	ok	lost after 33 (70?) days	looping on a rope
43878/ 1500501	ok	failure after 246 days	lost after 199 days	1) SST: sensor connection failure; 2) Drogue: looping on a rope

New prototype of Argos-2 buoy with 20-cm hull



Link: Argos-2

Tracking: GPS/Doppler

Samples: hourly

Envir.temp: minus 30°C

Lifetime: 180 days

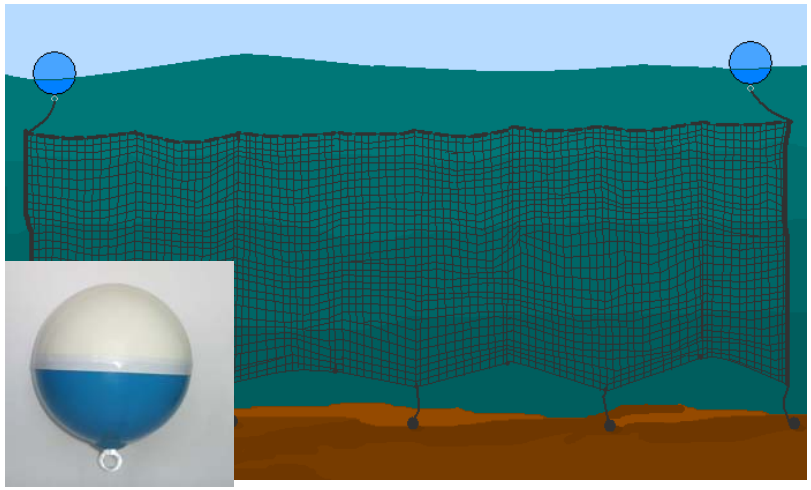
Battery: lithium

The variants to use Argos-2 buoy with 20-cm hull

Drifter for shallow water

Air deployment

Drifting fishing nets



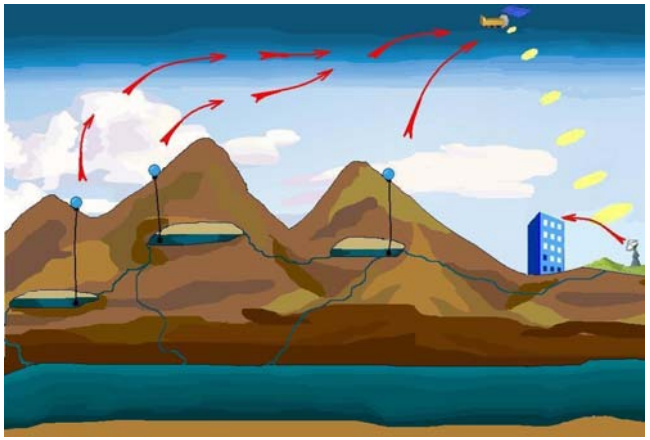
Ice buoy with AP

Tracking of icebergs, ice-floes with animals, oil spills

Transfer of Argos-2 drifter technology

Module of hydrostatic pressure

Water level inside mountains



Water Level Gauge for regions difficult of access

WLG-100

Monitoring of flooding

Water level in the wells

The problems fixed and ways to be eliminated

Buoy	The problem	Reason	Way to remove
SVP-B mini	AP spiking without drogue	Large inclination from vertical, when wind influence	Additional study
SVP-BTC80	Failure of hydrostatic pressure sensor after some time	Biology overgrowing of the hole to sensor	Another design of the head for sensor
SVP, SVP-B	Failure of SST sensor after some time	Internal connector	Another kind of connector
	Deployment of drifter without activation	Absence of automatic switch	Another design of the switch Thanks Julie Fletcher for her assistance

Conclusion

1. Iridium SVP-B/GPS drifter with 41-cm hull provides continuous set of hourly samples and GPS fixes for 2-year interval at least under harsh weather conditions of the South Ocean.
2. Iridium SVP-BTC80/GPS temperature-profiling drifter has 1-year lifetime. The buoy keeps continuity of samples as well as GPS fixes when 12-m and 6-m wave heights take place correspondently.
3. Argos-2 SVP-B/GPS mini drifter can ensure continuity of samples under harsh weather conditions and GPS fixes when wave height is up to 4 m.
4. Argos-3 buoys provide continuous set of hourly samples and longer lifetime in contrast with Argos-2 buoys, when same battery blocks are used.
5. SVP-B drifters with reliable AP samples under any weather conditions, as well as with longer lifetime can be used in the difficult of access South Ocean.
6. SVP-B mini drifters with shortened lifetime can be used in low latitudes, where there is probability to keep density of the net by means of ships of opportunity.
7. The main reason to get the Holey Sock lost is the loops on rope. Keeping of tether strained during submergence of drogue decreases probability of its fast loss. Better result should be, if tether is inserted inside rubber hose.
8. The parachute system, developed for dropping the buoys with 20-cm hull, increases areas of this tool use to study surface water and ice movement.


Thank you!