



Australian Government

Bureau of Meteorology

National Report by Australia

Australian Bureau of Meteorology

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Outline

- Drifting Buoy Program:
 - » Introduction & Planning,
 - » Buoy Types,
 - » Program Status,
 - » Review & Plans,
 - » Quality Monitoring,
 - » Buoy Lifetimes – Actual & Projected,
 - » Acknowledgements.
- EAC & Leeuwin Current Experiments.
- Australian Tsunameter Network.
- Australian Wave Data Network.
- OceanSITES.



Introduction & Planning

- Buoy Program started in the mid-1970s with FGGE.
- Goal : to support the ABOM's operational forecasting & warning service.
- Deployments mainly in the Indian & Southern Oceans:
 - » Contributes to the IBPIO, SOBP & IPAB.
- Deployments made from ships on an opportunity basis:
 - » Merchant, research, fishing, Customs, RAN, Antarctic re-supply.



Introduction & Planning (cont)

- Buoy Program runs from July to June:
 - » Aligns with the AU fiscal year & Government funding.
- Current funding provides for the purchase of:
 - » ~20 SVP-B style buoys each financial year; and
 - » ~8 SVP-B upgrade buoys each financial year.
- The Deployment Plan is prepared in July/August each year in consultation with key stakeholders:
 - » Regional Forecasting Centres;
 - » National Meteorological and Oceanographic Centre; and
 - » Weather Services Branch.



Program Status

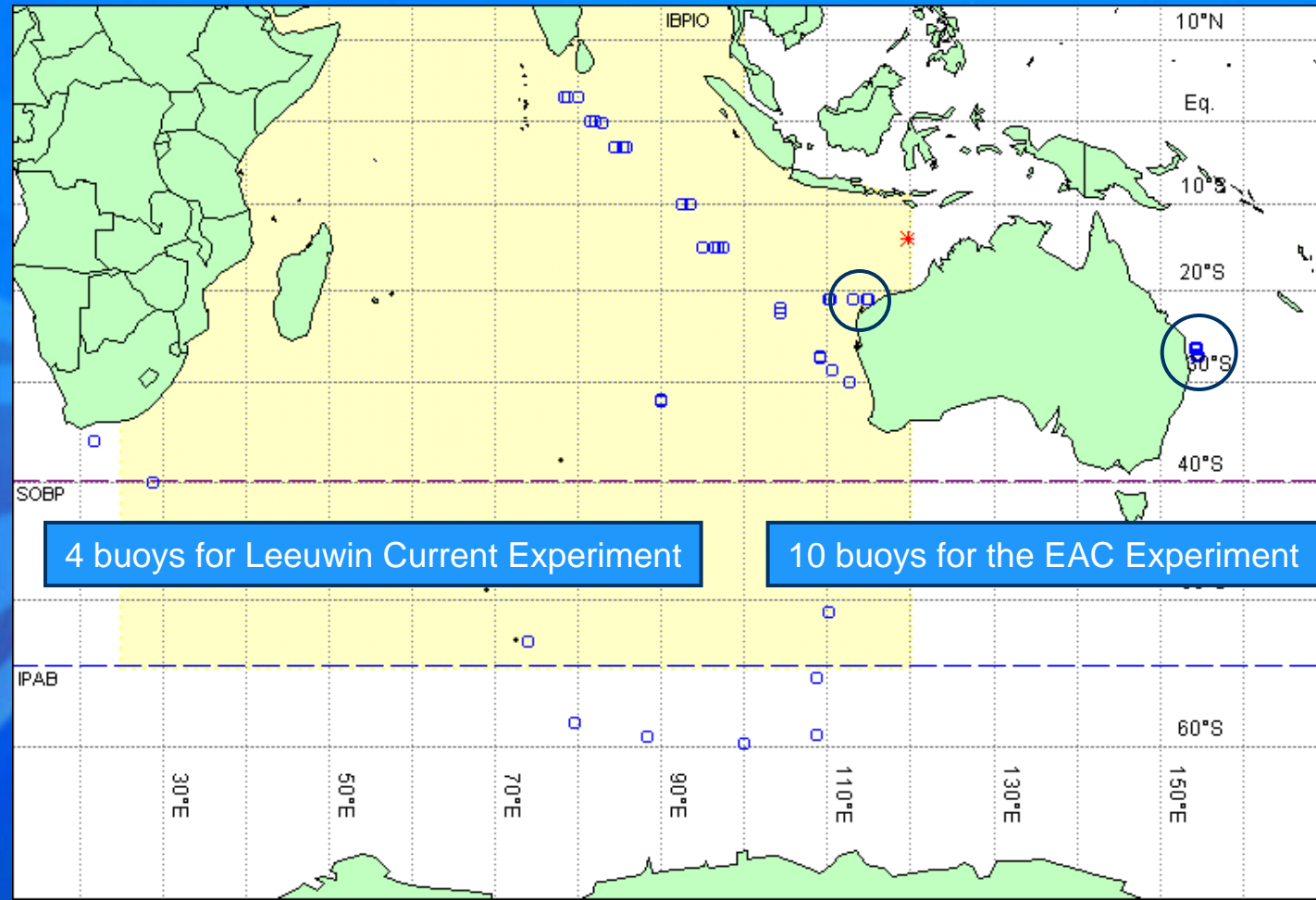
Program Description	Deployed 1-7-2009 to 30-6-2010	Active As at 31-7-2010	On GTS As at 31-7-2010
Bureau-owned buoys	22	28	28
Bureau-funded SVP-B upgrade buoys	2	6	6
GDC-supplied GDP buoys	34	22	22

58

The goal is 25 Bureau-owned buoys



2009/10 Review



- SVP-B
- ✱ SVP-BW

4 buoys for Leeuwin Current Experiment

10 buoys for the EAC Experiment

Includes: Bureau-owned buoys, Bureau-funded SVP-B upgrade buoys & Bureau-deployed GDP buoys



2010/11 Plans

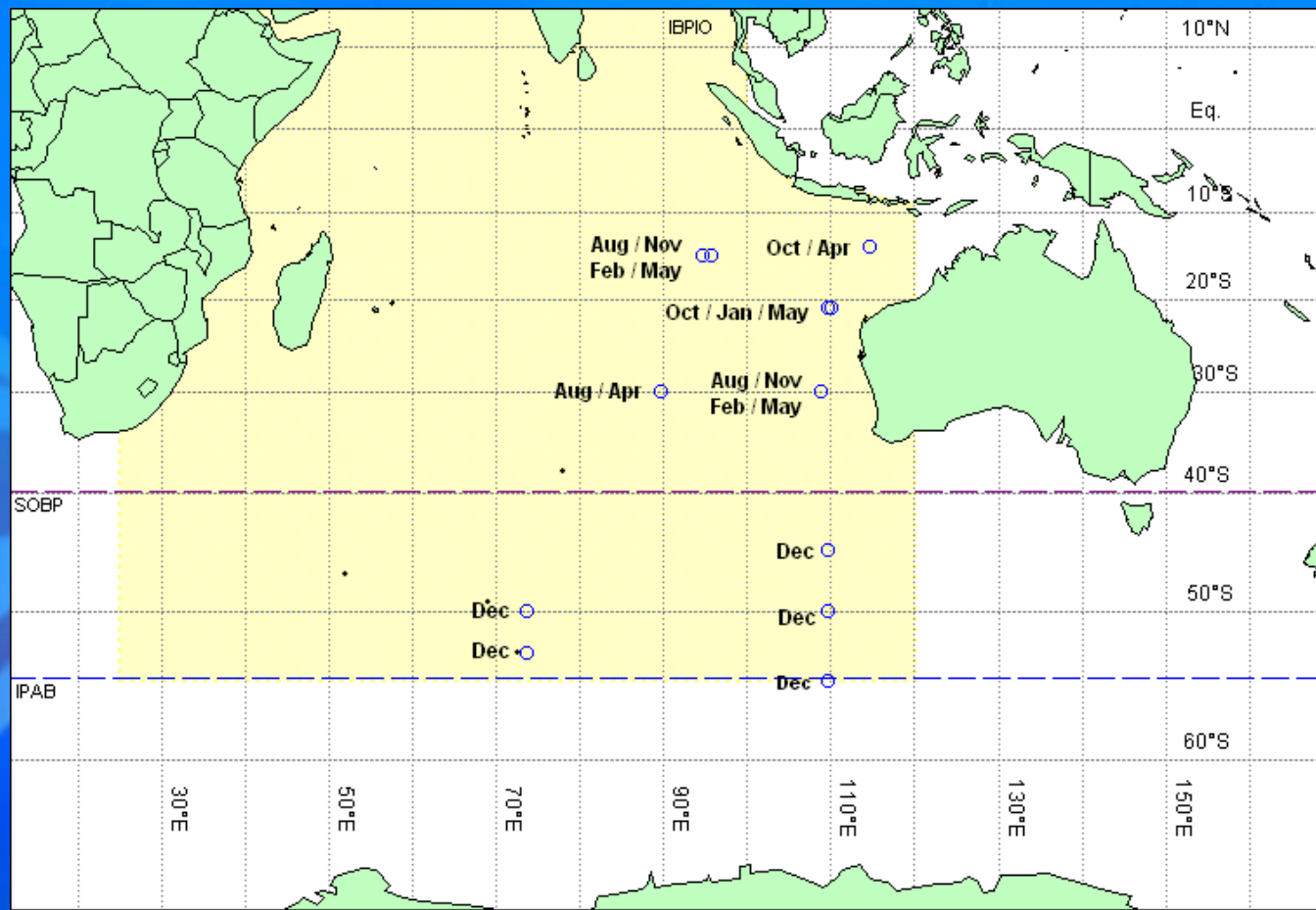
Program Description	Total	SVP-B	SVP-BW	SVP
Bureau-owned	20	20		
Bureau-funded upgrades	8	8		
GDC-supplied	20	20		

48

Details on the JCOMMOPS website: http://www.jcommops.org/depl_opport/australia.html



2010/11 Plans (cont)



○ SVP-B

Bureau-owned buoys only



Quality Monitoring Regime

- Weekly
 - » Météo France Buoy QC Tools.
- Monthly
 - » UK Met Office monitoring statistics.
- Occasional
 - » Buoy QC mailing list.
 - » JCOMMOPS QCRelay.
- Rarely
 - » Forecasters.



SVP-B Barometer Lifetime Analysis (1)

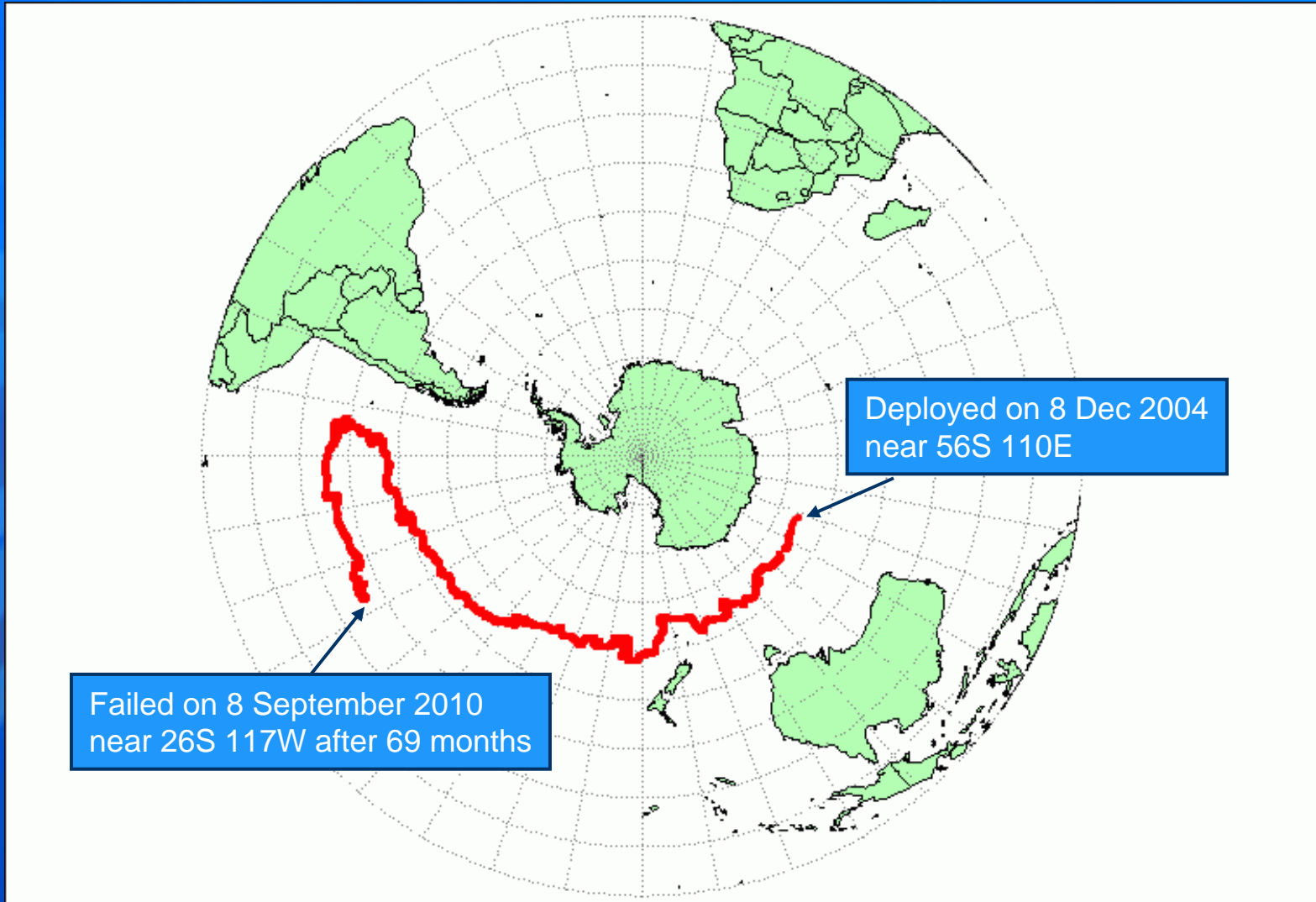
1. “Actual” mean lifetime by program and manufacturer, based on all failed barometers as at *21 September 2010*.
2. “Projected” mean lifetime by program and manufacturer, based on:
 - » all failed barometers as at *21 September 2010*, and
 - » all active buoys deployed before *1 January 2010* assigned a barometer fail date of *21 September 2010*.

A failed barometer is defined as:

- » Failure of the barometer sensor;
- » Barometer sensor declared suspect; or
- » Total buoy failure.

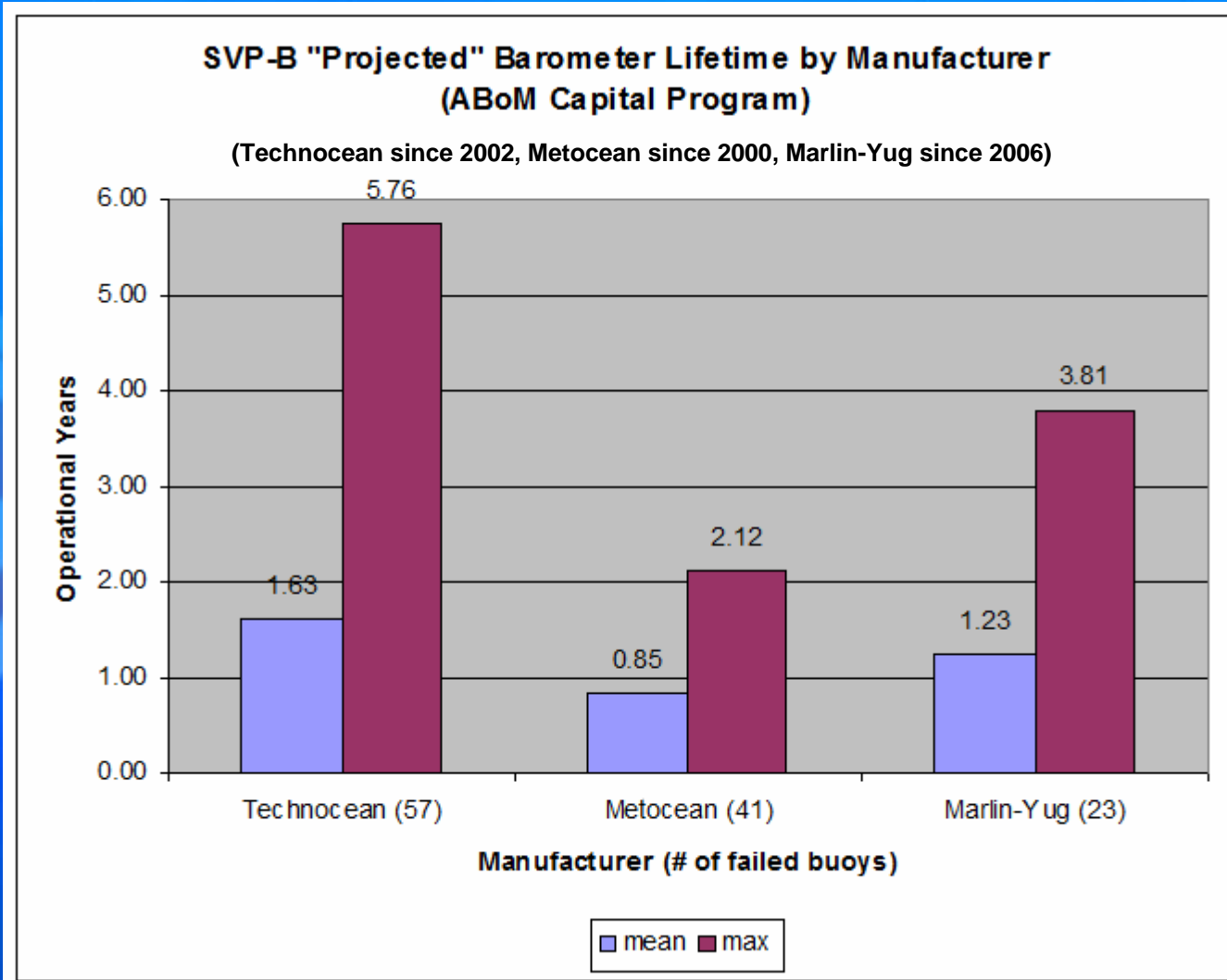


SVP-B Barometer Lifetime Analysis (2)



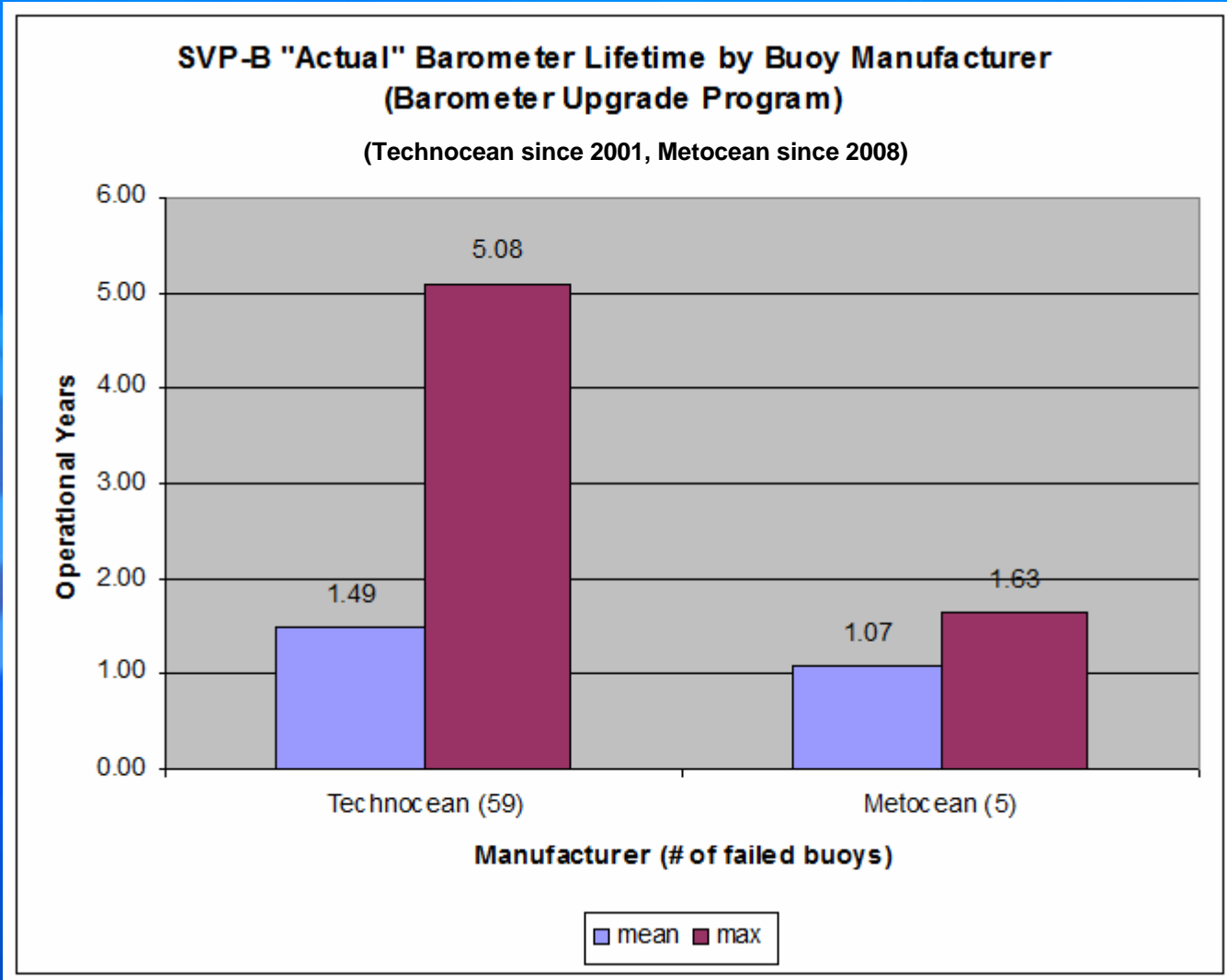


SVP-B Barometer Lifetime Analysis (3)



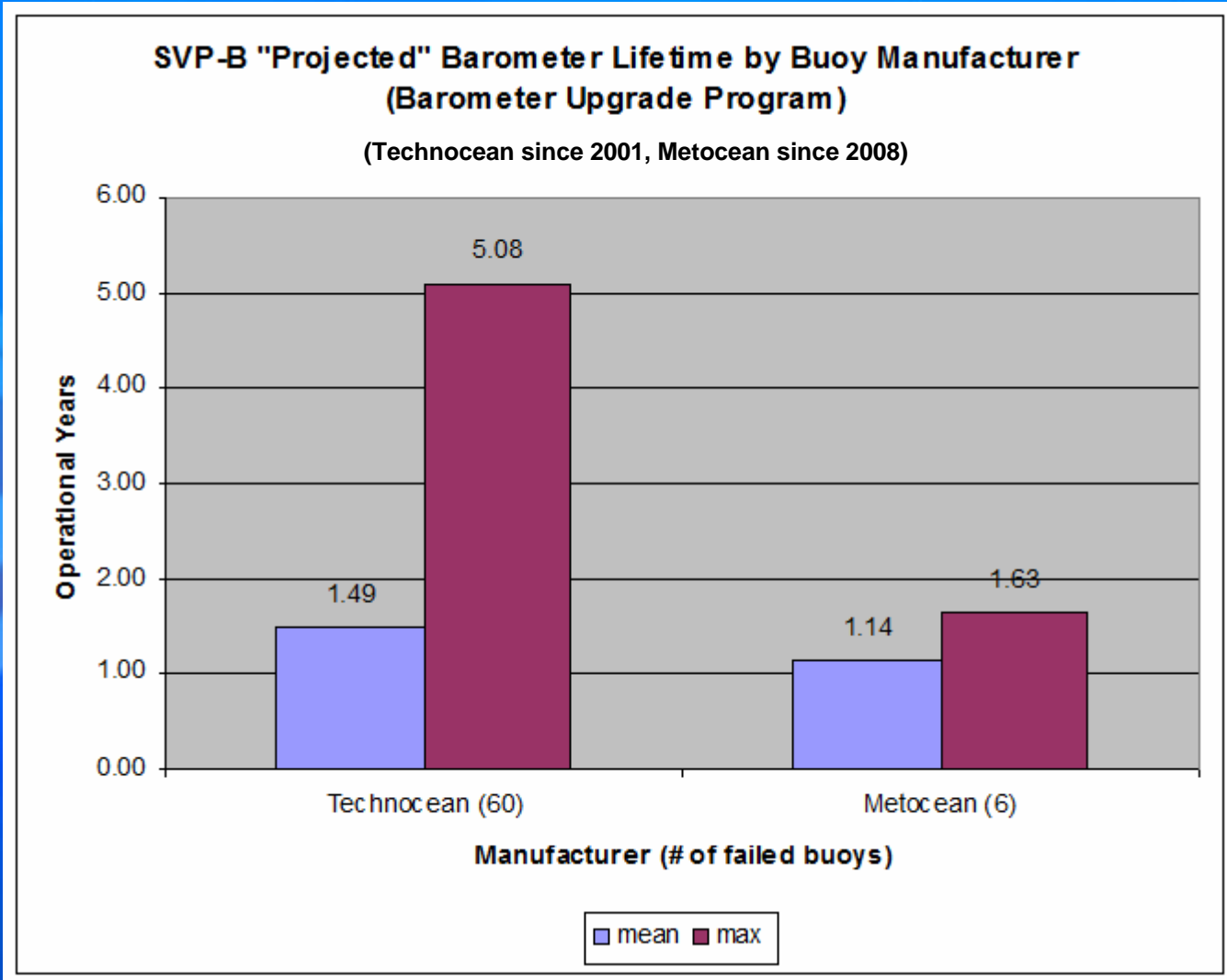


SVP-B Barometer Lifetime Analysis (4)



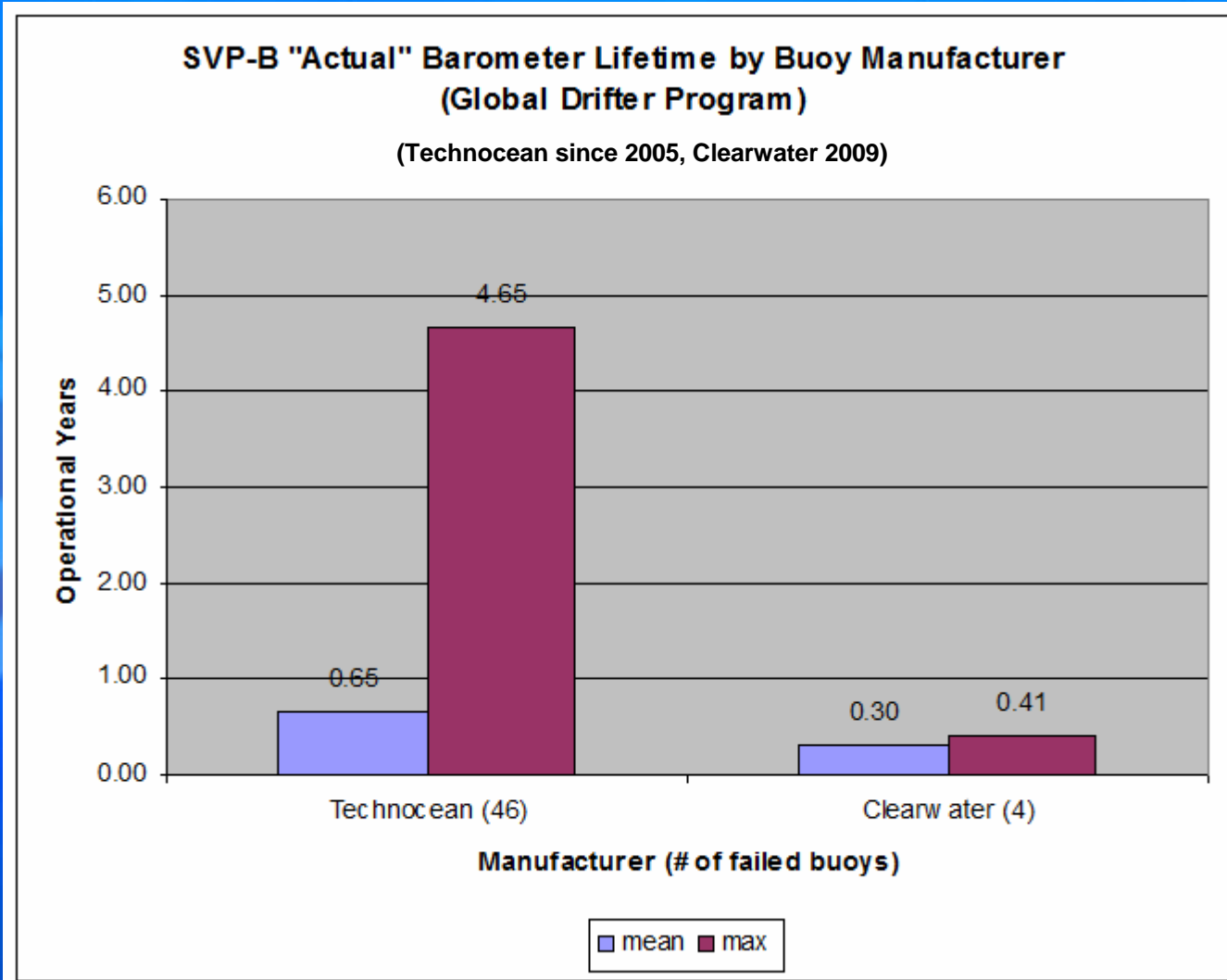


SVP-B Barometer Lifetime Analysis (5)



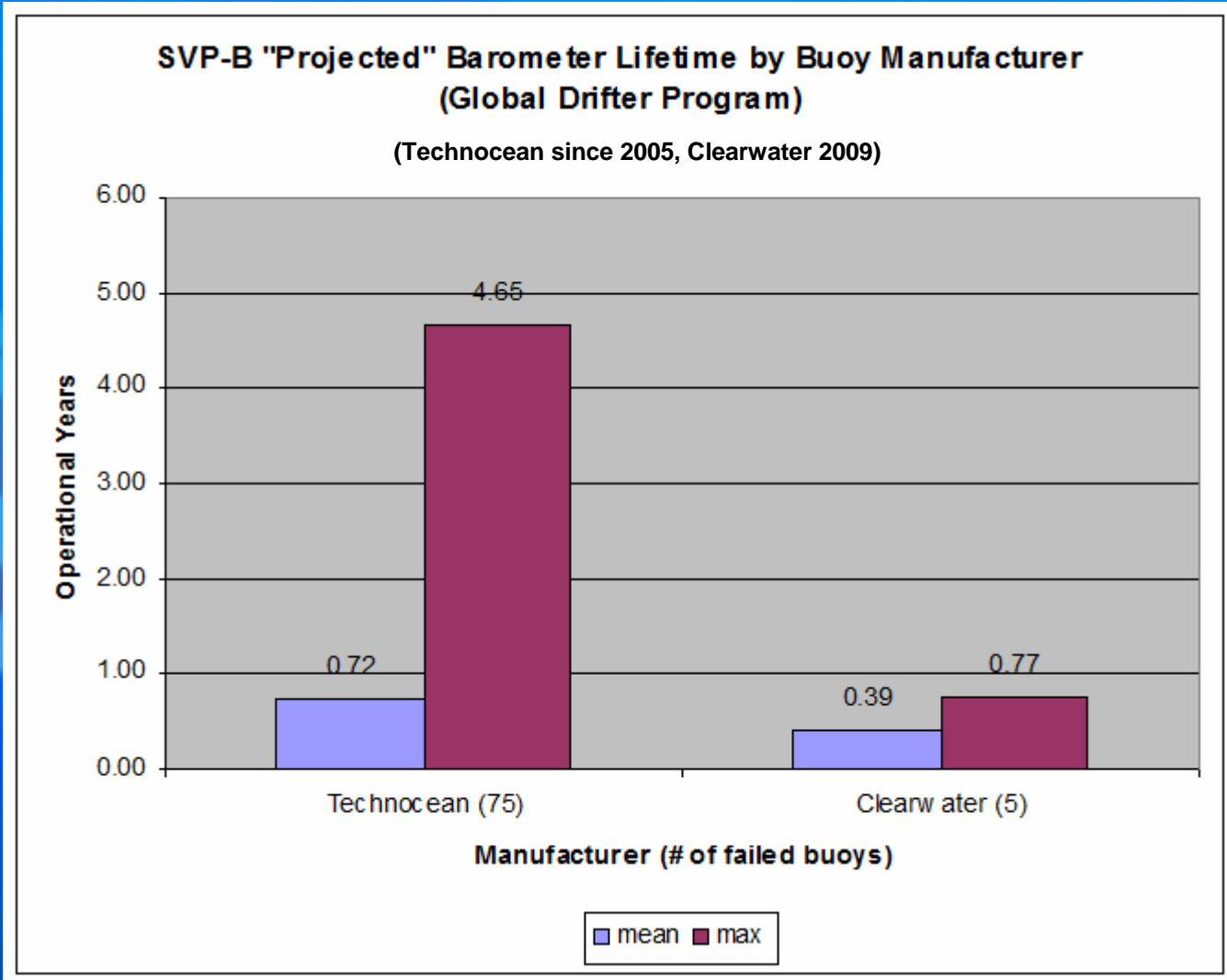


SVP-B Barometer Lifetime Analysis (6)





SVP-B Barometer Lifetime Analysis (7)



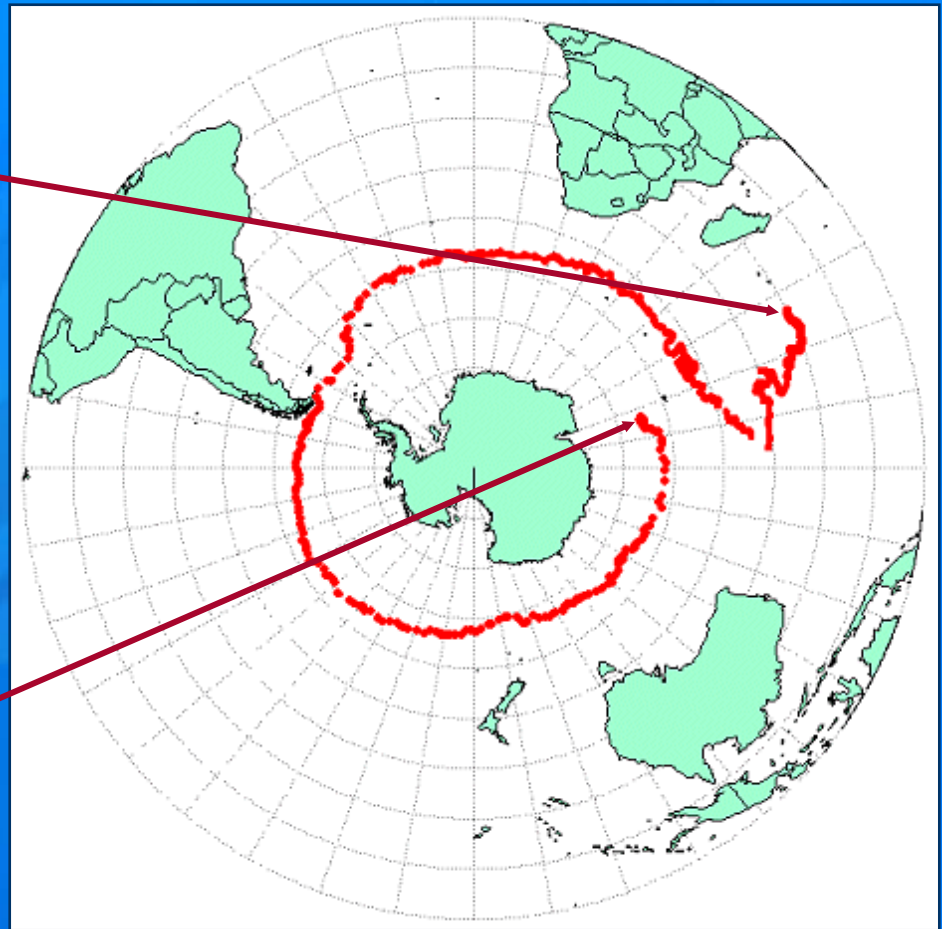


Longest-serving ABOM-owned Buoy

Beached 20 Sept 2002 on Rodriguez Island (20S 63E).

Failed 17 May 2003, after reporting AP, PT, AT & SST reliably & accurately for 2252 days (74 months).

Bureau-owned FGGE buoy, deployed on 17 March 1997 from R.S.V. Aurora Australis near 55S 74E.





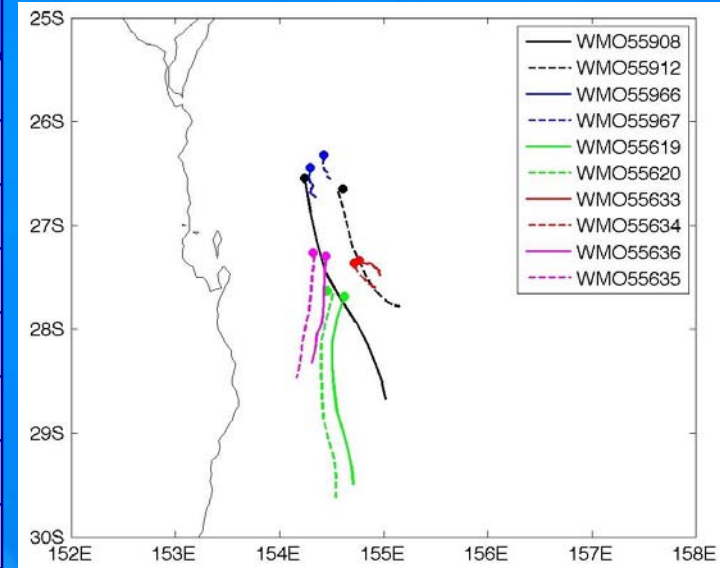
EAC Experiment (1)

- Summary of results from 2009/10:
 - » 100% deployment and observation yield.
 - » Observed a robust and stable EAC,
 - » Perturbations observed at Cape Byron that did not grow as in previous years,
 - » Retained high coastal temperatures and balmy conditions into late Autumn,
 - » “Autumn postponed as Hunter climate stays balmy” - headline from the *Newcastle Herald*, 23 April 2010, Melissa Lyons.



EAC Experiment (2)

ID's	Date	Position	Vessel
55908	15 Dec 2009	26.5S, 154.25E	Capitaine Tasman
55912	15 Dec 2009	26.45S, 154.5E	Capitaine Tasman
55966	8 Jan 2010	26.35S, 154.3E	Majala
55967	8 Jan 2010	26.3S, 154.4E	Majala
55916	30 Jan 2010	27.3S, 154.7E	MSC Sardinia
55920	30 Jan 2010	27.3S, 154.6E	MSC Sardinia
55633	12 Feb 2010	27.3S, 154.8E	MSC Tasmania
55634	12 Feb 2010	27.3S, 154.7E	MSC Tasmania
55636	27 Feb 2010	27.2S, 154.5E	MSC Nederland
55635	27 Feb 2010	27.2S, 154.4E	MSC Nederland



New vessels found with Capitaine Tasman and Forum Samoa II going off charter
 100 % success with initial deployments and observed the EAC (several multiple times)
 A spread in meridional position due to ship crossings
 Zonal accuracy is critical and was within the range specified



EAC Experiment (3)

Robust set of EAC observations
2009/10 EAC relatively stable
Separation migrating down the coast
Recirculation observed

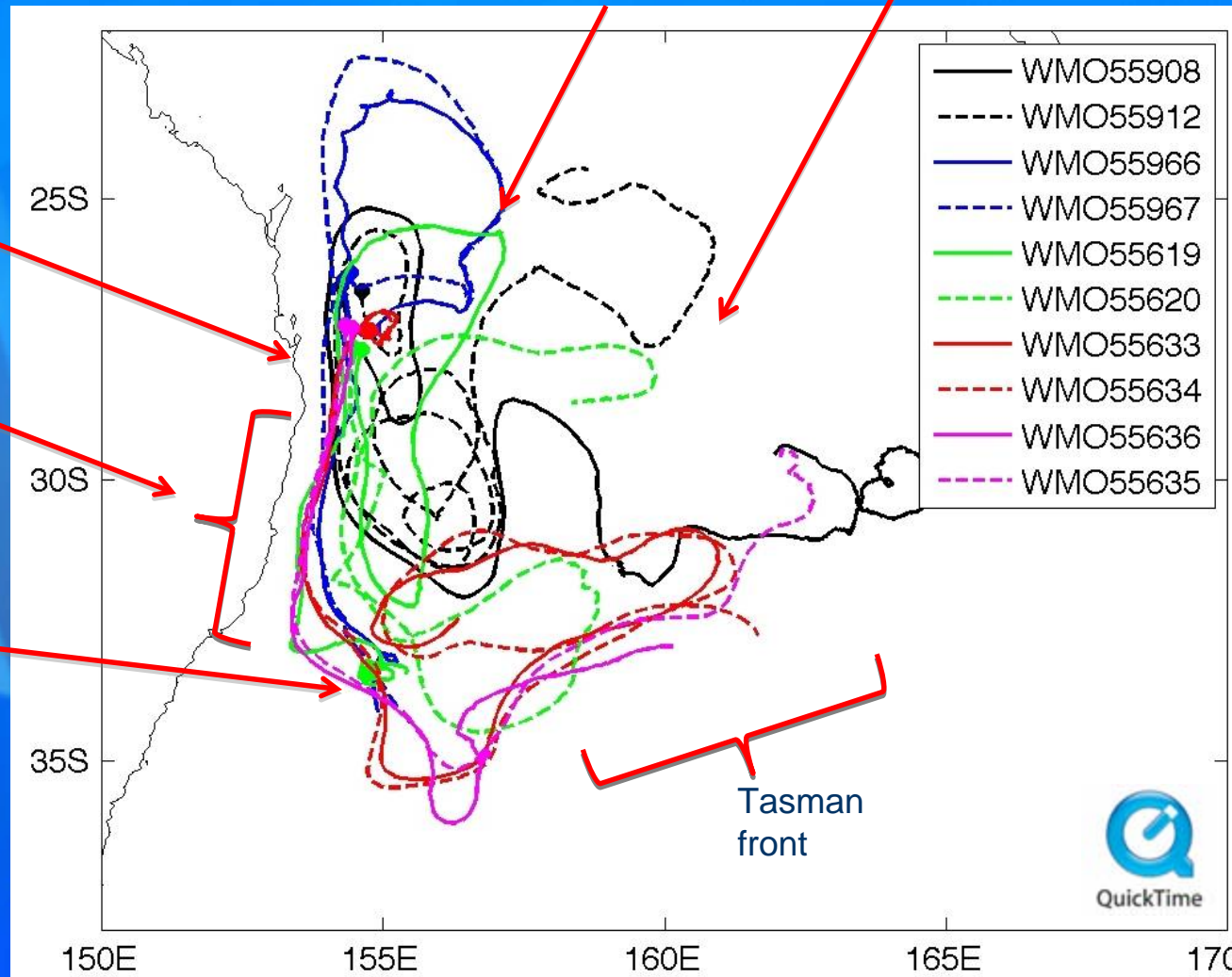
Trajectory anomaly

EAC separation evolution

Small scale vortice

EAC recirculation

Frontal system





EAC Experiment (4)

- Publications

- » **Brassington, G. B.**, 2010: Estimating surface divergence of ocean eddies using Lagrangian trajectories from surface drifting buoys, *J. Atmos. and Oceanic Tech.*, 27, 705-720, doi: 10.1175/2009JTECHO651.1
- » **Brassington, G. B., N. Summons and R. Lumpkin**, 2010: Observed and simulated Lagrangian and eddy characteristics of the East Australian Current and Tasman Sea, *Deep Sea Research* (in press, *Deep Sea Res*)



EAC Experiment (5)

- Target for 2010/11 - Sustain:
 - » EAC has significant interannual variations linked to ENSO (3-4 yr and the South Pacific (decadal)),
 - » EAC volume and heat transport have a dominant impact on the east coastal weather and ecosystem,
 - » The experiment (2007-10) is starting to capture the interannual variability into La Nina conditions,
 - » Immediate aim is to continue this program for 2010/2011 (8-10 buoys).
- An in principle agreement from the GDC to support the EAC deployments in 2010/11.



Related Activities Over Next 3 Years (1)

- BLUElink3 – funding for a 3 yr BoM/CSIRO/RAN project
 - » OceanMAPSv3.0 - 0.1° global (full Indian, South Pacific and Southern Ocean,
 - » CLAM-Tasman – 1/30° Tasman Sea Regional Ocean Model,
 - » Data assimilation of observed Lagrangian trajectories.
- IMOS2 Buoy Facility – funding proposal rejected.

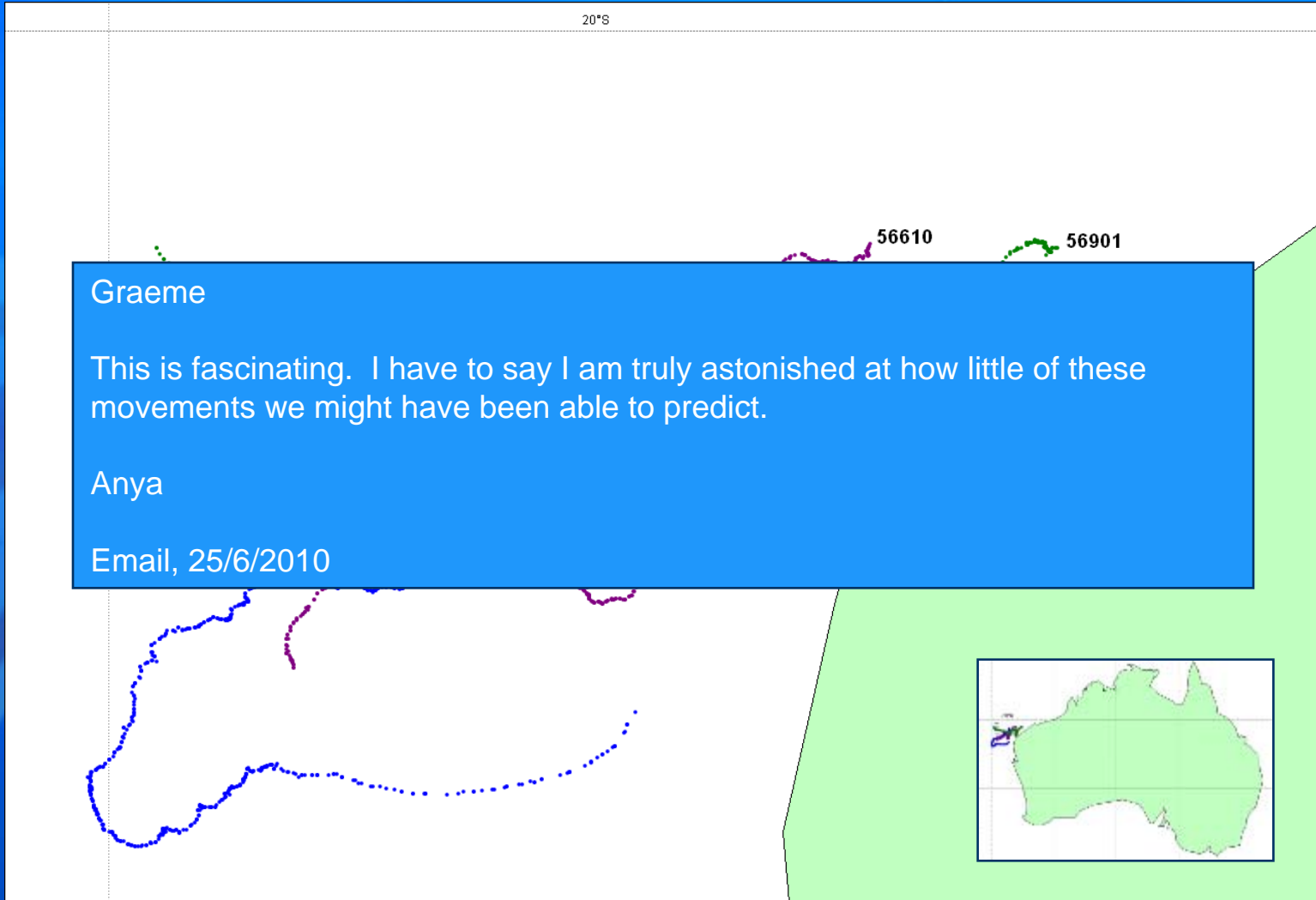


Related Activities Over Next 3 Years (2)

- ABLE-Tasman (adaptive buoy Lagrangian experiment)
 - » Intensive, multi-instrument obs campaign for the mesoscale ocean (buoys, ADCP, gliders),
 - » Multiple objectives, determine the impact of all and each type on ocean state estimation and forecast skill,
 - » Derive observation strategies for mesoscale prediction in the Tasman Sea,
 - » Air-deployable buoys explored (several challenges and unlikely to be available),
 - » Ship deployments based on RAN, VOS and research vessels,
 - » Staged plan 2011/12 pilot campaign >> 2012/13 full scale.



Leeuwin Current Experiment

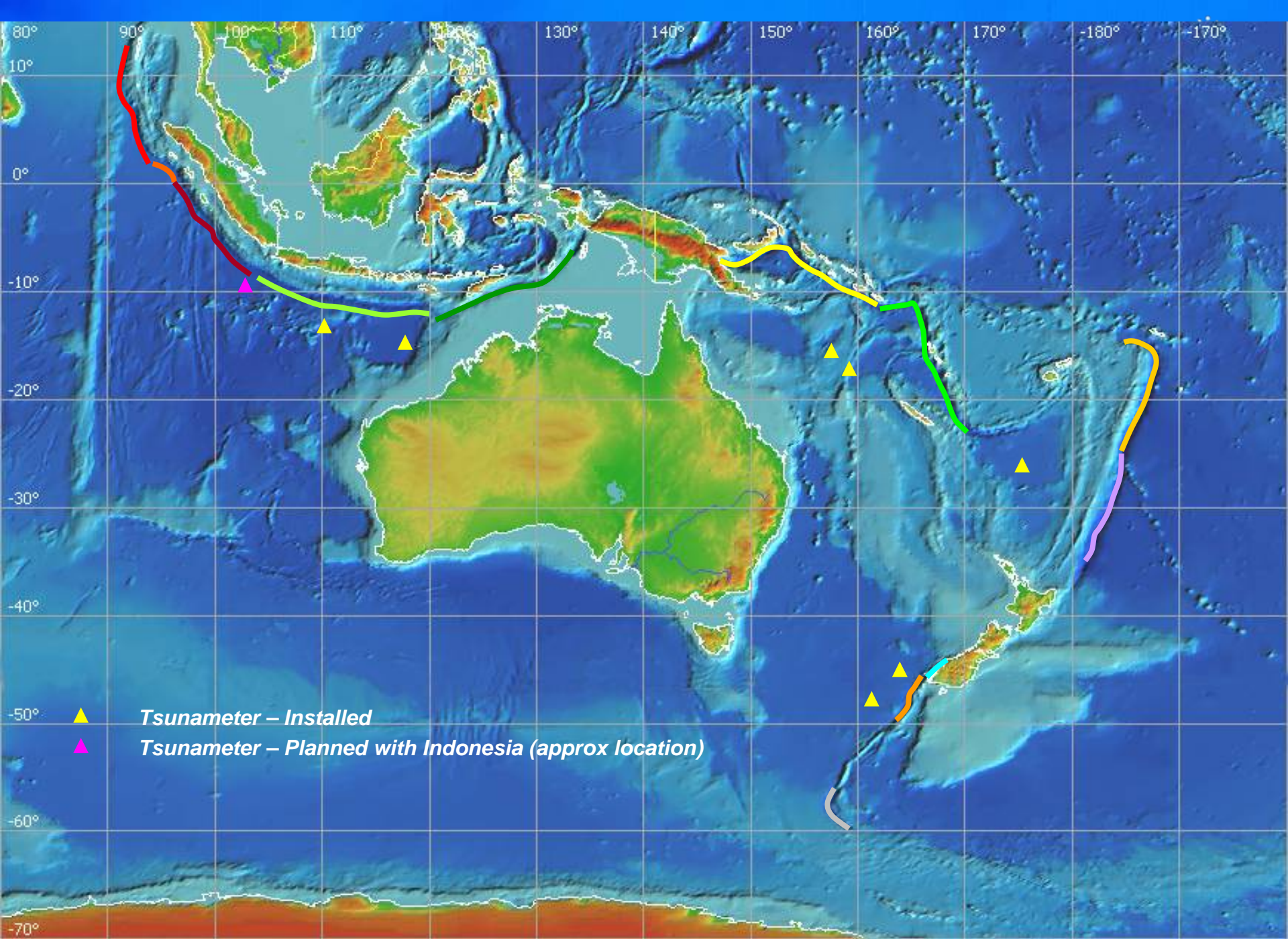


Graeme

This is fascinating. I have to say I am truly astonished at how little of these movements we might have been able to predict.

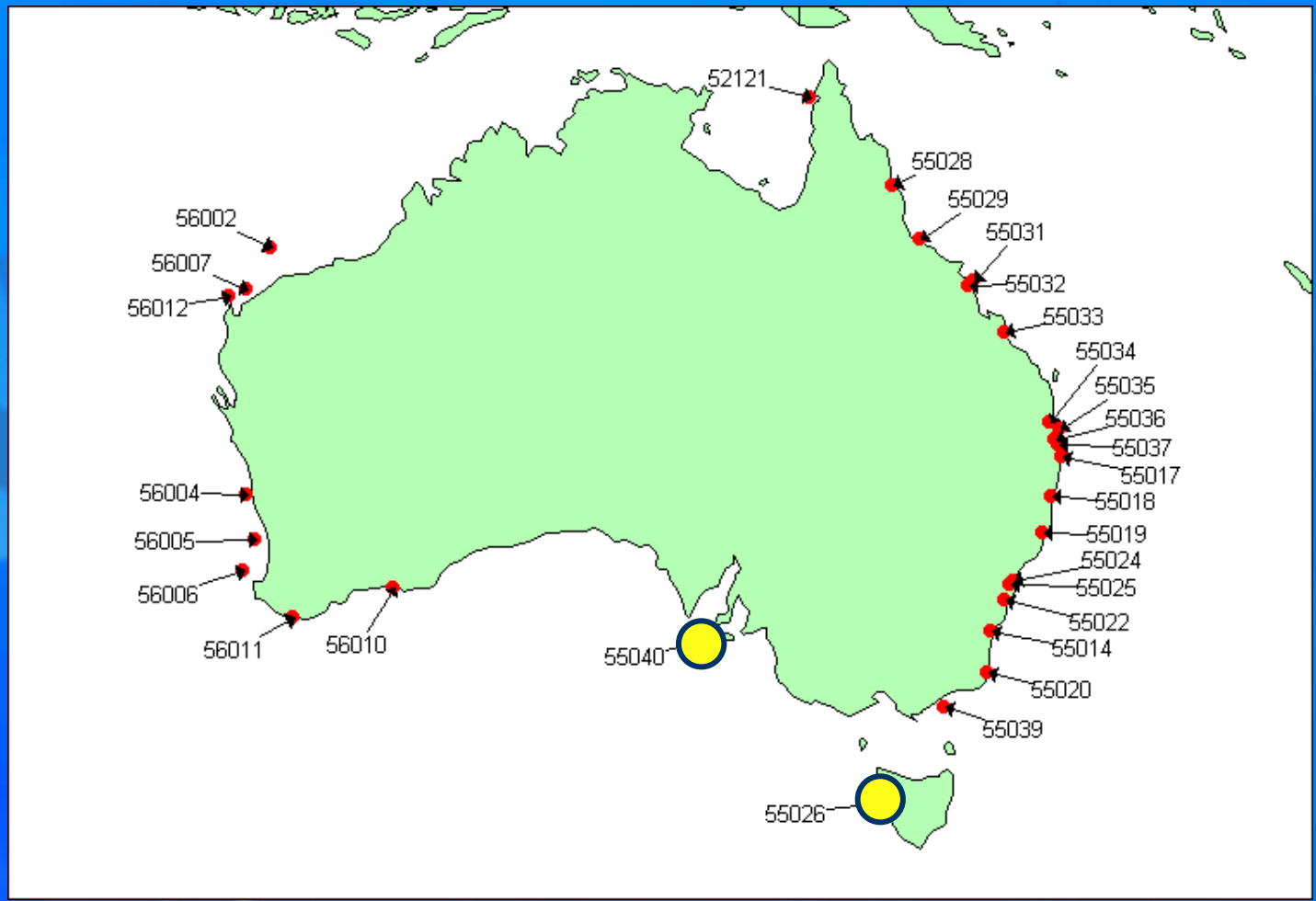
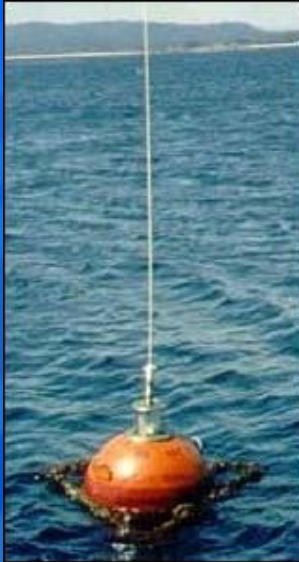
Anya

Email, 25/6/2010





Australian Wave Data Network





OceanSITES





Acknowledgements

- IBPIO & IPAB partners:
 - » NIPR – Shuki Ushio;
 - » GDC – Shaun Dolk; and
 - » Météo France – Jean Rolland.
- Port Meteorological Officers:
 - » Mal Young, Fremantle;
 - » Albert Dolman, Melbourne; and
 - » Sidney Marais, Cape Town.
- Masters and crews of all the deploying vessels.

