The Australian IMOS *OceanCurrent* Gridded Sea Level Anomaly product

David Griffin, Madeleine Cahill, Ken Ridgway and Jeff Dunn   CSIRO Marine and Atmospheric Research

Introduction

The IMOS Gridded Sea Level Anomaly (GSLA) system is similar to the AVISO DUACS system. Here, we assess the performance of DM00, a recent (but pre-GDR-D) trial 4-year (2003-2006) processing of the Geophysical Data Records obtained from RADS.

Method

- Critical RADS choices were: DTU10 MSS, CLS non-parametric SSB, MOG2D IB, GOT4.8 ocean tide, smoothed dual-frequency ionospheric correction.
- Sea level anomaly editing of tracks with |pass_mean - global_mean| > 12cm, spikes of 35cm, or tropical anomaly of 40cm.
- Coastal sea level anomaly (IB adjusted) is interpolated every 20km along the coast between available tide gauges.
- Ducet et al. (2000) spatial covariance. (1+cos) temporal weighting, zero at t+/-15days. Grid resolution 0.2°x0.2°

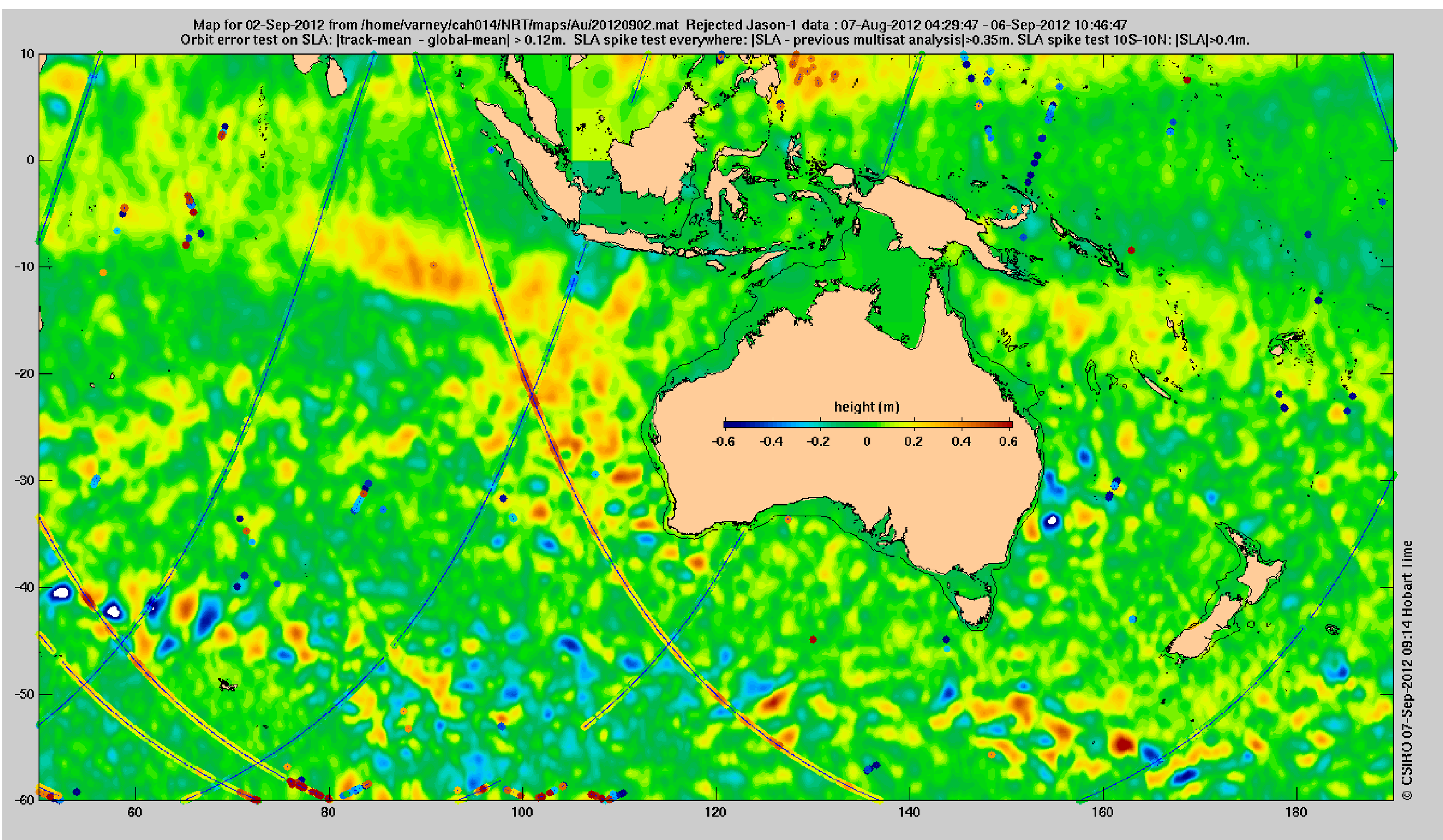

Figure 1: Error detection is critically important for near-real-time (IGDR) data but still important for the GDR, from which we have removed some whole tracks or isolated points.

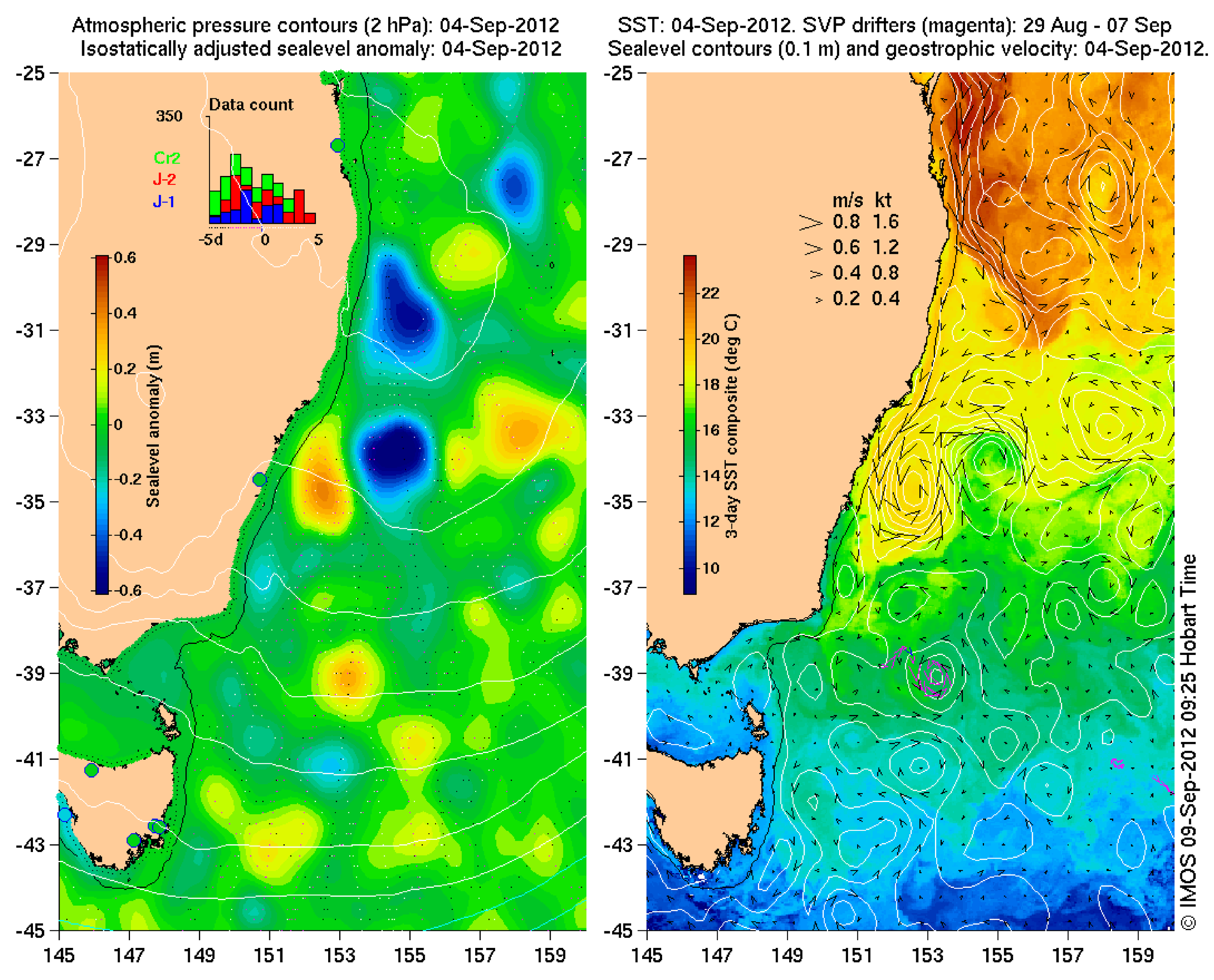

Figure 2: Regional maps of height anomaly and geostrophic current overlain on SST are updated daily at http://oceancurrent.imos.org.au/.

Results

The DM00 maps are a tighter fit to the RADS track data than is the recent AVISO re-analysis, presumably because of the different input data as well as details of the editing and interpolation.

	bias	Std. dev.	r.m.s
DM00	-0.02cm	4.1cm	4.1cm
AVISO	3.8cm	5.1cm	6.4cm

Table 1: Statistics of the difference between the along-track data from RADS and two multi-mission analyses of sea level anomaly in the Australasian region. Only track data within a 48h time window (centred on the analysis time of each map) contribute to these statiistics.

Argo steric height anomalies provide an independent estimate of the accuracy of sea level anomaly analyses. The two systems have similar std. dev. but DM00 has less bias, leading to a lower r.m.s difference from the 3800 Argo estimates.

	bias	std. dev.	r.m.s
DM00	-0.04cm	4.36cm	4.36cm
AVISO	4.14cm	4.74cm	6.29cm

Table 2: Statistics of the difference between 3800 Argo estimates of surface steric height anomaly and two multi-mission analyses of sea level anomaly in the Australasian region.

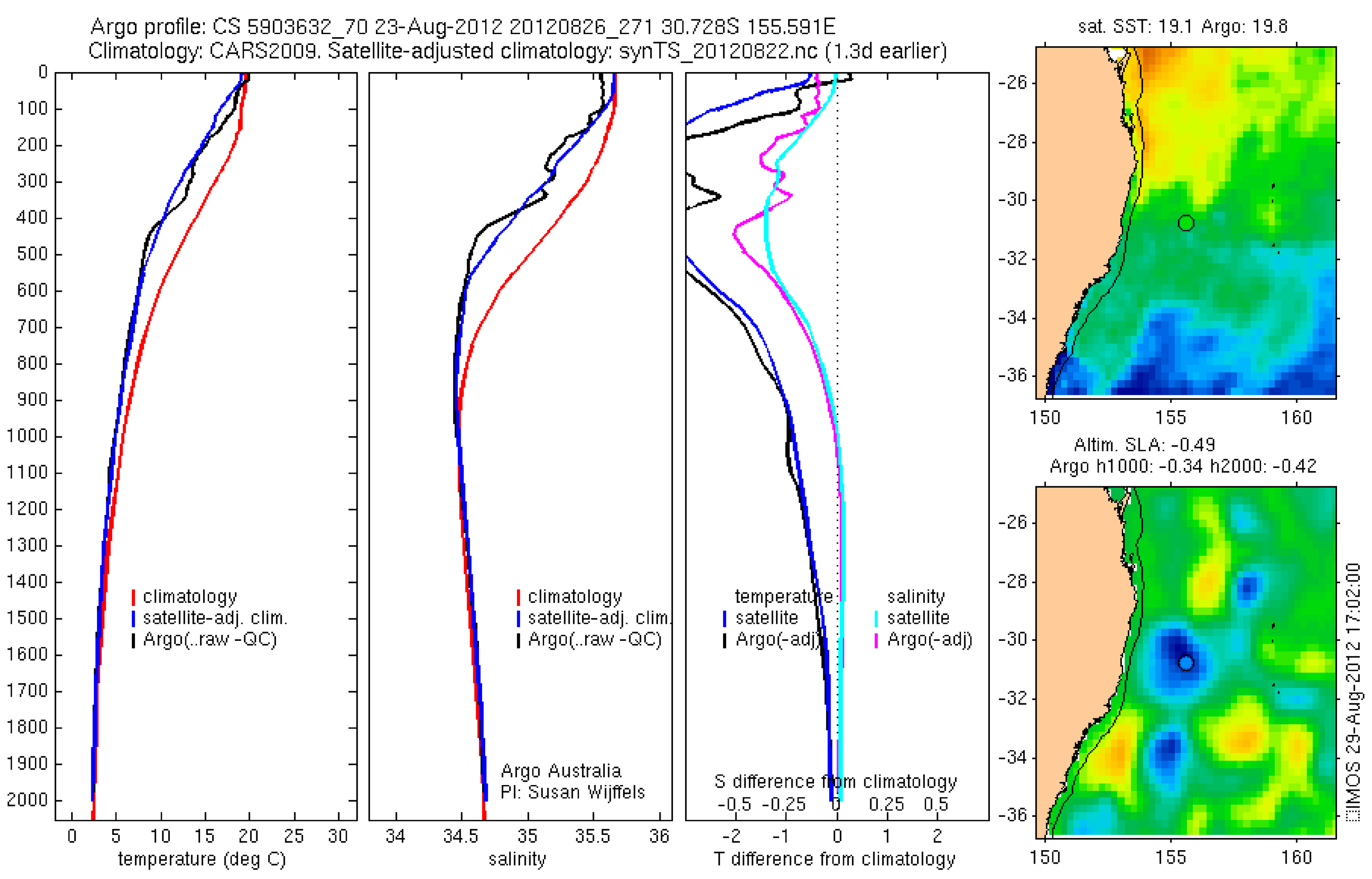

Figure 3: The close agreement of altimetric sea level anomaly with surface steric height is the basis for an estimation of subsurface properties using an empirical relationship that has high skill, especially in the Tasman Sea, as shown above. We call this 'satellite adjusted climatology', or 'synthetic TS'. Sea level anomalies in the Tasman are due to temperature and salinity anomalies that are greatest at 300m.

Conclusion

Thanks to the recent re-processings, the different altimeters now agree with each other better, allowing multi-mission analyses like ours to fit the data more closely (4cm r.m.s). A 1992-2012 reanalysis will soon be complete, to complement the near-real-time counterpart of DM00 that is already available at http://tds.arcs.org.au/thredds/catalog/IMOS/OceanCurrent/GSLA/catalog.html

IMOS Integrated Marine Observing System

National Research FLAGSHIPS   CSIRO

References

Ducet N., P.Y. Le Traon and G. Reverdin, 2000: Global highresolution mapping of ocean circulation from the combination of T/P and ERS-1/2. *J. Geophys. Res., 105,* 19,477-19,498..

Acknowledgements

IMOS is supported by the Australian Government through the National Collaborative Research Infrastructure Strategy and the Super Science Initiative. We thank NASA, CNES, ESA and NOAA for supporting the missions, and the NOAA RADS team for maintaining the RADS data base.

Further information

contact: David Griffin
phone: +61 3 62325244
email: David.Griffin@csiro.au

www.csiro.au