



Observations and Modeling of the North West Shelf of Australia during Austral Summer 2011/2012

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During the austral summer of 2011/2012, a series of collaborations between U.S. and Australian funded projects led to the collection of a large observational and modeling dataset for the North West Shelf of Australia. These partnerships resulted in the deployment of 30 moorings at 23 different sites and 5 AUV gliders for various intervals of measurement between November 2011 and August 2012. This region is best known for its strong tidal flows and highly energetic internal tides, but lower frequency flows are also significant with the postulated Holloway Current flowing towards the southwest along the coast and providing a possible limited connecting pathway between the Indonesian Throughflow and the Leeuwin Current.

Observations from ADCP current meters over this austral summer showed a weak (3-12 cm/s) mean south-westward flow, but this mean masked generally stronger low-frequency, along-shore flows that reached 25 cm/s or more in either direction, reversing at weekly or longer periods. In general currents tended to be northeastward in Nov.-Dec. and southwestward in Jan.-Apr., but reversals from these trends occurred during both periods. Bottom pressure records from the moorings indicated highly coherent bottom pressure anomaly fluctuations at all sites but also showed a reversal of the onshore/offshore pressure gradient from Nov. to Apr.

Two tropical cyclones (Iggy and Lua) passed close by the North West Shelf during the observational period, and in both cases the coastal circulation towards the southwest was strengthened during the storms and then reversed towards the northeast after the storms. Other reversals occurred that were not associated with tropical cyclone dynamics. Analyses of these data and associated modeling runs are ongoing and directed towards the goal of better understanding the low-frequency dynamics of this coastal current. Additionally, understanding the physical forcing of this connecting current will be helpful for future work on the biological connectivity between reef communities located along the North West Shelf.