



## Zonal jets entering the Coral Sea

Gourdeau L., W. Kessler, R. Davis, D. Sherman, C. Maes, and E. Kestenare

The South Equatorial Current (SEC) entering the Coral Sea through the gap between New Caledonia and the Solomon Islands was observed by an autonomous underwater vehicle (Spray glider) and an overlapping oceanographic cruise during July-October 2005 (Secalis 3). The measurements of temperature, salinity and absolute velocity included high-horizontal-resolution profiles to 600m depth by the glider, and sparser, 2000m-deep profiles from the cruise. These observations confirm the splitting of the SEC into a North Vanuatu Jet (NVJ) and North Caledonian Jet (NCJ), with transport above 600m of about 20 and 10 Sv, respectively. While the 300-km-wide NVJ is associated with the slope of the main thermocline, and is thus found primarily above 300m, the NCJ is a narrow jet about 100 km wide, just at the edge of the New Caledonian reef. It extends to at least 1100m depth, with very little shear above this depth, where its speed is more than  $20 \text{ cm s}^{-1}$ . An Argo float launched east of New Caledonia, with a parking depth fixed at 1000 m, became embedded in the NCJ and crossed the glider/cruise section at high speed about 3 months before the glider, suggesting that the jet is the continuation of a western boundary current along the east side of the island, and extends across the Coral Sea to the coast of Australia. In the lee of New Caledonia, the glider passed through a region of eddies whose characteristics are poorly understood.

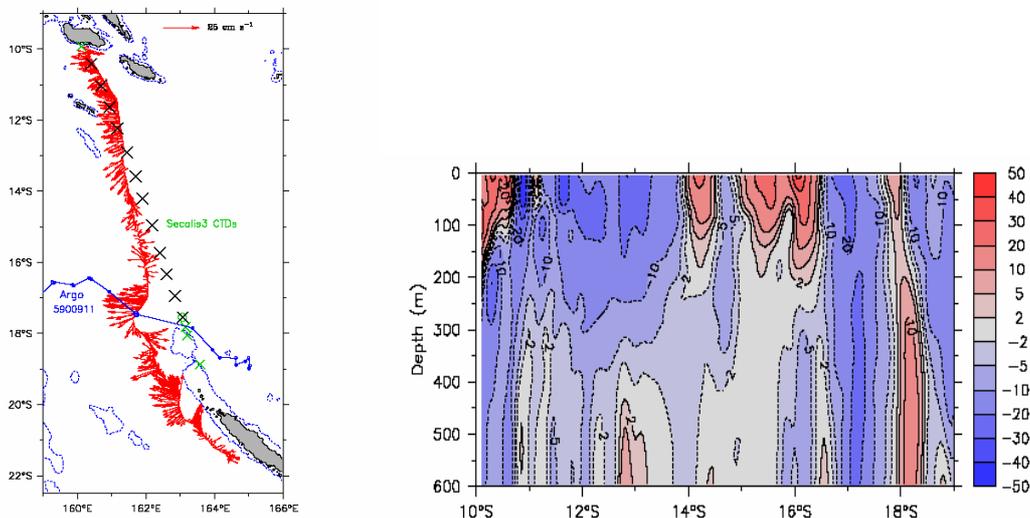


Figure: left) Observations made during this study: Absolute velocity (red vectors) averaged over the upper 600m, measured by the glider for each dive, is shown along the glider section between Guadalcanal and New Caledonia. Superimposed are the locations of the 17 Secalis3 stations extending to 2000m depth. The trajectory and profile locations of the Argo float 5900911 are in blue. Land is shaded gray and the 500m isobath is the blue dashed contour, showing the northward extension of the reef at the extremity of New Caledonia. Right) Absolute cross-track geostrophic velocity ( $u_g$ ;  $\text{cm s}^{-1}$ ) determined by the glider. The NCJ is centered around  $17^\circ\text{S}$ , and exhibits a quasi barotropic structure.

(For more details, see: J. Phys. Oceanogr., Vol. 38, No. 3, 714-724, 2008)