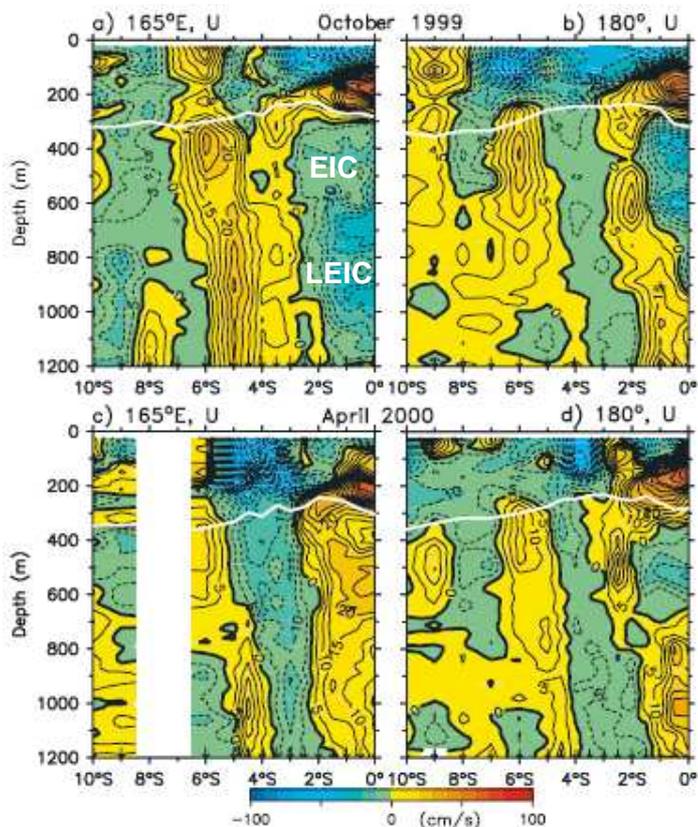


# Upper and intermediate circulation in the western equatorial Pacific Ocean in October 1999 and April 2000

Y. Gouriou, T. Delcroix and G. Eldin

In this study, the upper and intermediate circulation (0–1200 m) in the western equatorial Pacific Ocean are examined thanks to Lowered Acoustic Doppler Current Profiler (LADCP) measurements carried out during two cruises in October 1999 and April 2000. Several new features of the equatorial circulation are discussed. It is shown that the secondary South Subsurface Counter Current (sSSCC) laying at 6°S– 400 m depth, had a deep extension at 165°E with a maximum core velocity around 5°S–1000 m. Furthermore the Equatorial Intermediate Current (EIC) and the Lower EIC (LEIC) displayed a strong temporal variability between 165°E and 180°, as these two westward currents were replaced by eastward flow along the equator on the second cruise. Finally during the April 2000 cruise the zonal velocity profile carried out at the equator east of the Gilbert Island (around 175°E) broke into small vertical scales, possibly reflecting topographic effect and/or destabilization mechanism that leads to the formation of long zonal jet-like structures. One of the most striking conclusion of that paper is that the zonal transport of EIC and LEIC has varied between the two cruises by about  $10^8 \text{ m}^3\text{s}^{-1}$ . This huge transport variability cannot be ignored when discussing the zonal mass balance of the equatorial Pacific Ocean, and it may have consequences on climatic variability in the tropical Pacific. To investigate this hypothesis, researchers from the OLVAC team at LEGOS are currently studying variability of the equatorial deep current system in a model run. After careful validation of model results, variability of the different currents at seasonal to inter annual time scales will be evaluated.



**Figure :** Latitude-depth sections of the zonal component of the velocity, in  $\text{cm s}^{-1}$ , at (a) 165°E in October 1999, (b) 180° in October 1999, (c) 165°E in April 2000, and (d) 180°E in April 2000. Eastward flow in yellow, westward flow in blue. Potential isopycnal  $26.5 \text{ kg m}^{-3}$ , denoting the base of the thermocline, is superimposed on the plots (white line). Station positions are shown at the bottom of every plot. At 165°E, a strong variability of the current system is evidenced below the thermocline and between 5°S and the equator, including a reversal of the EIC and LEIC.

Reference : Gouriou, Y., T. Delcroix, and G. Eldin (2006), Upper and intermediate circulation in the western equatorial Pacific Ocean in October 1999 and April 2000, *Geophys. Res. Lett.*, 33, L10603, doi:10.1029/2006GL025941. (AGU 2006 Highlight paper)