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The mean and time-variability of the shallow meridional overturning circulation in the tropical South Pacific Ocean

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Geostrophic and Ekman transport calculated using 1x1 gridded Argo temperature and salinity profiles and ECMWF ERA-Interim surface winds are used to study the time-variability of the shallow Meridional Overturning Circulation also known as the subtropical cell (STC) in the Pacific Ocean within 2S-15S over the 2004-2010 period. Particular attention is given to the transports in the western boundary (west of 158E) and in the interior (from 159E to the South American coast). The poleward (Ekman) and equatorward (geostrophic) branches of the STC exhibit an ENSO signature with strong (weak) meridional transport occurring during La Nina (El Nino) events. At 7.5S, mean geostrophic transport (0-1000 dbar) integrated from 148.5E to 85.5W is 49 Sv, of which 39 Sv returns to the subtropics in the surface Ekman layer, whereas 10 Sv flows northward feeding the Indonesian Throughflow. The geostrophic transport within the STC is stronger in the interior and weaker in the western boundary during La Nina. The opposite occurs during El Nino. The major portion of the time-variability in geostrophic transport from 148.5E to 85.5W is due to changes in the interior. Stronger (weaker) STC strength induces cool (warm) sea surface temperature anomalies in the upwelling region by transporting more (less) subtropical cool waters. The contribution of the oceanic advection to the heat budget near the equator will be considered.