Geophysical Research Abstracts
Vol. 17, EGU2015-11749, 2015
EGU General Assembly 2015

Water Mass Modification through Mixing in the Solomon Sea

Marion Alberty (1), Jennifer MacKinnon (2), and Janet Sprintall (3)

(1) Scripps Institution of Oceanography, University of California San Diego, La Jolla, United States (malberty@ucsd.edu), (2) Scripps Institution of Oceanography, University of California San Diego, La Jolla, United States (jmackinnon@ucsd.edu), (3) Scripps Institution of Oceanography, La Jolla, United States (jsprintall@ucsd.edu)

The Solomon Sea is a semi-enclosed sea located in the Equatorial southwest Pacific. With its complex topography and strong channel flow, the Solomon Sea has the potential to strongly mix water masses consisting of Antarctic Intermediate Water and South Pacific Subtropical Mode Water traveling equatorward to join the Equatorial Undercurrent. Observations of temperature and salinity relationships from the primary entry and exit points of the Solomon Sea circulation display erosion of the transported water masses and relaxation of the temperature-salinity gradients. In addition the surface signature in the northeast channels indicate the presence of a different water mass implying recirculation and variability in the surface transport which is consistent with model simulations of the region. The spatial and temporal variations in mixing through out the sea are investigated using CTD and LADCP profiles taken during two cruises in the Solomon Sea. Turbulent diffusivity is estimated by two fine scale parameterization methods. The first method takes advantage of an empirical ratio of Thorpe to Ozmidov length scales below the mixed layer and estimates diffusivity from overturn length and local stratification. This method employs data from the CTD at 1 m resolution. The second method uses shear derived from LADCP data and compares the variance of the spectra to that of the canonical Garrett-Munk model. The same is done with strain variance from CTD estimated buoyancy profiles and the ratio of the shear to strain variance is estimated for the region. Further estimates of mixing are derived from ARGO profiles, utilizing the region's ratio of shear to strain variance derived from the shipboard profiles. The spatial patterns display enhanced mixing near abrupt topographic features and in channels where vertical shear is strongest. Mixing in the thermocline layer is enhanced during the first cruise, which was concurrent with strong regional monsoonal wind forcing.