Mountains to the Sea
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VIEW ABSTRACT

LONGITUDINAL CONTRAST IN SMALL SCALE TURBULENCE ALONG 20S: ORIGIN AND IMPACT ON BIOGEOCHEMICAL FLUXES

We report on in-situ observations along a longitudinal transect in the tropical Pacific over a 40° longitude range collected during the OUTPACE cruise (http://dx.doi.org/10.17600/15000900). Our purpose is to characterize small-scale dynamics and three-dimensional turbulence in the first 800m surface layer based on hydrographic and current measurements at fine scale (CTD, LADCP, ship ADCP) and turbulence measurements at cm scale using a VMP microstructure profiler. Turbulent biogeochemical fluxes are computed based on the turbulent eddy diffusivity inferred from turbulence measurements and vertical profiles of nitrates, cholorophyll and oxygen. Dissipation rate of turbulent kinetic energy, ε shows an interesting contrast along the longitudinal transect with higher turbulence level in the Western part, i.e. the Coral Sea, compared to the Eastern part within the gyre. Also the vertical extension of the surface layer where turbulence is higher decreases eastwards. We show that this spatial pattern is related to the energy level of the internal wave field, higher in the West compared to the East. This results from an enhanced wind power input and internal tide generation in the Western part. We next focus on the analysis of three stations performed over 3 inertial periods at longitudes 164E, 171W and 165W. We show how the submesoscale vorticity triggers IW propagation and energy transfers within the internal wave field. Eventually the impact of turbulence on biogeochemical fluxes in the euphotic layer is discussed.

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DETAILS

Oral presentation

Session #:019
Date: 03/02/2017
Time: 12:15
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