# Intermediate Intraseasonal Variability in the Western Tropical Pacific Ocean: Meridional Distribution of Equatorial Rossby Waves Influenced by a Tilted Boundary

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Intermediate-depth intraseasonal variability (ISV) at 20-90-day period, as detected in velocity measurements from seven subsurface moorings in the tropical western Pacific, is interpreted in terms of equatorial Rossby waves. The moorings were deployed between 0˚ and 7.5˚N along 142˚E from September 2014 to October 2015. The strongest ISV energy at 1200 m occurs at 4.5˚N. Peak energy at 4.5˚N is also seen in an eddy-resolving global circulation model. An analysis of the model output identifies the source of the ISV as short equatorial Rossby waves with westward phase speed but southeastward and downward group velocity. Additionally, it is shown that a superposition of first three baroclinic modes is required to represent the ISV energy propagation. Further analysis using a 1.5-layer shallow water model suggests that the first meridional mode Rossby wave accounts for the specific meridional distribution of ISV in the western Pacific. The same model suggests that the tilted coastlines of Irian Jaya and Papua New Guinea, which lie to the south of the moorings, shift the location of the northern peak of meridional velocity oscillation from 3˚N to near 4.5˚N. The tilt of this boundary with respect to a purely zonal alignment therefore needs to be taken into account to explain this meridional shift of the peak. Calculation of the barotropic conversion rate indicates that the intraseasonal kinetic energy below 1000 m can be transferred into the mean flows, suggesting a possible forcing mechanism for intermediate-depth zonal jets.

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