



Turbulent mixing and its relationship with internal tides in the Indonesian Throughflow as inferred from the INDOMIX cruise

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The Indonesian Throughflow is the only passage at low latitude between the Pacific and the Indian oceans. As such it constitutes a key region of the thermohaline circulation. It is in this region that warm less salty waters originated from the Pacific ocean flow into the Indian ocean. During this path water mass properties are strongly modified as a result of a strong turbulent mixing.

As the Indonesian seas are one region of the strongest internal tide generation it is expected that these waves will play a major role in driving turbulent mixing. Moreover this impact is more likely enhanced by the geography of these semi-enclosed seas where internal waves once generated remain trapped.

The INDOMIX cruise aimed to characterize small-scale turbulence and mixing and its relationship with the larger scale internal tide signal. The INDOMIX cruise focused on one of the most energetic sections for internal tides through Halmahera sea and Ombai strait. Classical fine-scale temperature, conductivity and current measurements have been performed together with microstructure measurements with repeated profiles over 24 hours. These measurements evidenced a strong internal tide signal with currents up to 50 cm/s amplitude and solitary waves leading to isopycnal displacements of the order of 50m. Spots of high energy dissipation and turbulent mixing were characterized from microstructure measurements and the relationship with the internal wave field established. Eventually a set of fine-scale parameterizations was tested against our direct turbulence measurements and a refined parameterization proposed.