

In Situ Observations of the Spatial Variation of Waves and Momentum Flux in Typhoons

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The spatial variability of waves and winds within violent tropical cyclones (TC) (i.e. hurricanes and typhoons) are of importance for accurate prediction of storm intensity. It is very difficult to make observations in TC conditions. Therefore a comprehensive understanding of their inner workings has remained elusive, although some progress has been made. To understand the variability of wave spectra, recent studies have employed remote sensing techniques (Wright et al. 2001) and composite measurements from buoys (Hu and Chen 2011). In combination with remotely sensed wave measurements, Holthuijsen et al. (2012) measured the spatial variation of momentum flux with drop sondes. Here, to the authors' knowledge, we are the first to present direct observations of both wave spectra and momentum fluxes, *in situ*, in the direct vicinity of TCs. The *Impact of Typhoons on the Ocean in the Pacific* (ITOP) field campaign took place in late 2010 within the Philippine Sea approximately 740 km east of southern Taiwan. Two mooring sites were located approximately 180 km apart. Each site included a buoy with a 6m NOMAD type hull called EASI (Extreme Air Sea Interaction) (Drennan et al. manuscript in progress) which was moored to the bottom, and an ASIS (Air-Sea Interaction Spar) buoy (Graber et al. 2000) tethered to EASI by a 60 m braided steel line. The moorings operated continuously for approximately 4 months and endured the relatively close passages of 4 major storms: Tropical Storm Dianmu, Typhoon Fanapi, Super Typhoon Megi, and Typhoon Chaba.

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