

A Category '6' Trio –Supertyphoons Meranti (2016), Haiyan (2013), and Hurricane Patricia (2015)

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With peak intensity reaching 165 kts, supertyphoon Meranti was the most intense tropical cyclone on earth in 2016. Only 5 kts below the devastating super-typhoon Haiyan in 2013, Meranti was the 2nd most intense western Pacific typhoons on record. In ~2.5 days, it rapidly intensified from category-1 to an impressive, category '6' (Lin et al. 2014; Lin et al. submitted 2017) intensity of 165 kts. Similar to Hurricane Patricia (185 kts, 2015, Huang et al. 2017) and Supertyphoon Haiyan (170kts, 2013), the peak intensity of these tropical cyclones are far above (30-50kts) the existing threshold (135 kts) of category-5 in the Saffir-Simpson scale. In addition, their intensity square (representing kinetic energy and a function of the Accumulated Cyclone Energy) is 140-180% higher than a 'regular' category 5 cyclone of 140kts. In terms of intensity cube (a function of the Power Dissipation Index), these extra-ordinary storms are 165-230% higher than a 140 kts category 5 cyclone (Lin et al. 2014; Lin et al. submitted 2017). This research highlights the importance of adding the new category '6' (165-185 kts) to the current Saffir-Simpson scale, for more accurate disaster mitigation and public awareness, because these category '6' TCs may carry much higher energy than regular category '5' TCs (e.g. other 140kts category 5s). In addition, they were all found to be associated with very favourable sea surface temperature (SST~30C) and subsurface heat content conditions (~120-140 kJ/cm²). This research further explores their interaction with ocean, as well as the oceanographic origin of these extremely favorable ocean conditions.

H.-C. Huang, J. Boucharel, I-I Lin*, Fei Fei Jin et al., Air-Sea Fluxes for Hurricane Patricia (2015): Comparison with Supertyphoon Haiyan (2013) and under Different ENSO Conditions, submitted, *J. Geophys. Res.*, 2017.

I-I Lin*, Mong-Ming Lu, et al., Taiwan in the hits of major typhoons, submitted, *BAMS*, State of Climate Report, 2017.

Lin I. I., I.-F. Pun, and Lien, C.-C. (2014) 'Category-6' supertyphoon Haiyan in global warming hiatus: contribution from subsurface ocean warming. *Geophys. Res. Lett.*, doi:10.1002/2014GL061281.