

The Study of Proper Radius of Maximum Wind for Storm Surge Prediction in Taiwan and the South China Sea Regions

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In Taiwan, we are under the threat of storm surge because locating at the densest storm-generated area in the world. The operational storm surge model is required to predict water elevation at specified tidal stations and associated inundation before typhoon making landfall in Taiwan. In storm surge prediction, the radius of maximum wind (RMW) and the drag coefficient (Cd) are both key parameters when the parametric typhoon model is applied. Therefore, the predicted storm surges will be influenced if RMW and Cd would not be determined well. The Cd value used in storm surge modeling have been discussed in many works of literature by field observations or experiments (e.g. Large and Pond, 1981; Wu, 1980; Powell et al., 2003; Donelan et al., 2004; Peng and Li, 2016) but the RMW is not widely discussed. In this study, the applicability of different formulas to determine the RMW will be discussed and conducted in our storm surge model. The storm surge model we adopt here is COMCOT-SS (COrnell Multi-Grid Coupled of Tsunami Model –Storm Surge) model which transforms from a well-known tsunami model to storm surge model after adding meteorological forcing terms. Our in-house COMCOT-SS has abilities: solve nonlinear shallow water equation on both spherical coordinate and Cartesian coordinate, adopt large enough computational domain to cover the complete typhoon life cycle and full storm surge propagation and calculate high-resolution inundation area for risk assessment. The 2015 Severe Typhoon Soudelor in Taiwan is chosen as case study to validate the applicability of the RMW after different formulas have being conducted. The simulated results by different RMW' s formulas are compared with observed storm surges. More details will be presented in 2017 JPGU conference.

Keywords: Storm Surge, Radius of Maximum Wind (RMW), COMCOT-SS