Analysis of typhoon tracks and associated precipitation amount over western Japan: A case study with Typhoon Nancy and Typhoon Jebi

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Recent research suggests that typhoons under future warming climate will be more powerful and bring excessive precipitations to the landfall areas. In our study, we downscaled two very strong Typhoons [Typhoon Nancy (international #196118) and Typhoon Jebi (international #201821)] at 1-km grid resolution in present climate and with pseudo global warming (PGW) conditions by using Weather Research and Forecasting (WRF) model. An attempt is also made to examine whether the precipitation amounts carried by Typhoon Jebi can be projected from Typhoon Nancy with PGW conditions, because both typhoons made landfall over same region of Japan with a difference of 57 years. Our results indicate that the typhoon tracks in present climate simulation have good agreement with that of from the RSMC, Tokyo’ s best track datasets. The precipitation amounts over western Japan in the present climate simulation also follows the Radar-AMeDAS observed precipitation amounts. We again find similar typhoon tracks under PGW conditions for both typhoons with higher winds and precipitations compared to that of in present climate simulation. The precipitation amounts associated with the Typhoon Nancy in future climate is found to be higher than that of with Typhoon Jebi during the landfall. However, the 24 hours accumulated precipitation amount brought by Typhoon Nancy with PGW conditions has an overall good agreement with that of by Typhoon Jebi in present climate simulation especially over landfall region. Closer investigation on the typhoon tracks and typhoon induced precipitation amounts suggests that Typhoon Jebi is a possible projection of Typhoon Nancy although it was formed over different location.

Keywords: Typhoon Nancy, Typhoon Jebi, Typhoon track, Typhoon intensity

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