

## Extended-range forecast of tropical cyclogenesis in the western north Pacific using a global nonhydrostatic atmospheric model on the K computer

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Since tropical cyclones (TCs) frequently cause tremendous damage to human lives and property, accurate extended-range forecast of TC genesis is valuable for inhabitants in low latitudes. Nakano et al. (2015, GRL) performed 31 one-month simulations using a global nonhydrostatic atmospheric model, NICAM, initialized at each day of August 2004 and demonstrated that the model can predict TC geneses 2 weeks in advance. August 2004 is the active phase of boreal summer intraseasonal oscillation (BSISO) in the western north Pacific and TC genesis is affected by the BSISO. Therefore predictability of TC genesis in various phases of BSISO has not been clarified. In this study, a total of 248 one-month simulations using 14-km-mesh NICAM initialized at each day of August 2007-2014 which covers various phases of BSISO and predictability of 13 TC genesis which occurred in the latter half of August are examined. The results show that 9 out of 15 TC geneses are predictable about 2 weeks in advance. Generation of 3 TCs which are weak (minimum sea level pressure is higher than 990 hPa) and/or duration is shorter than 3 days are not predicted. The reasons for missed TC geneses of the remains (3) in the model are not clear so far. The large scale circulation in NICAM at phase 7 of BSISO (most favorable phase for TC genesis) from phase 4 are compared with those from operational models (ECMWF, MetOffice) taken from the THORPEX Interactive Grand Global Ensemble (TIGGE). The results shows that eastward extension of monsoon trough is not enough in the ECMWF model. The MetOffice model simulates eastward extension of monsoon trough, but intensity is weak. NICAM well reproduces the monsoon trough in terms of eastward extension, but intensity is overestimate and position is north of observed.

Keywords: tropical cyclone, global nonhydrostatic atmospheric model, extended-range forecast