A Numerical Study on Heavy Rainfall of Jakarta Flood Event in January-February 2007

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Heavy rainfall lasted for several days from late January to early February 2007 in Jakarta and its vicinity had turned into a disastrous flood event. The highest rainfall recorded by Meteorological, Climatological and Geophysical Agency (BMKG) in this period was 340 mm at Pondok Betung Station. The event coincided with a strong and persistent trans-equatorial monsoon flow from the Northern Hemisphere (Wu et al. 2007). We perform an ensemble hindcast experiment of the event and compare synoptic conditions during the event with those for the periods before and after the event.

Japan Meteorological Agency (JMA) non-hydrostatic model (NHM; Saito et al. 2007) is used for the numerical experiment. It is a regional model with a horizontal grid distance of 20 km. National Centers for Environmental Prediction (NCEP) final analysis (FNL) is used for initial and boundary conditions. We perform time-lagged ensemble hindcasts by starting 3-day integrations at every 6-hour interval from 1 January 2007 00UTC to 28 February 2007 00UTC. The model specifications and parameter settings are the same as those employed in Hayashi et al. (2008).

The model performances are assessed by comparison with ground station data obtained by BMKG and some satellite data, including rain-rate of TRMM 3B42. Generally the spatial distributions of rainfall from the model output agree well with the satellite observations, though the model output, especially rainfall for particular points, does not fit exactly. Frequency distribution of precipitation of all the nine ensemble members for the inland grids over West Java shows an elongated tail in the heavy rain-rate for the pentad corresponding to the flood period. This is indicative of the possibility of a potential forecast of the phenomena.

Keywords: ensemble hindcast experiment; heavy rainfall; Jakarta flood 2007; JMA/NHM:

References

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