Predictability of the July 2018 Heavy Rain Event in Japan Associated with Typhoon Prapiroon and Southern Convective Disturbances

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In July 2018, record-breaking heavy precipitation caused catastrophic disasters in west Japan. This study investigated the predictability of this event using a regional ensemble data assimilation system. A series of daily ensemble forecast experiments showed that the forecast ensemble spread during the heavy precipitation event increased in the forecasts initialized on July 1 and July 3. The first peak was associated with the track forecast of Typhoon Prapiroon. In the forecast initiated on July 1, about a half of the ensemble members predicted eastward recurvature of the typhoon, whereas the other members predicted that the typhoon stayed near China. The later spread peak was associated with the southern convective disturbances over the East China Sea. Composite analysis and ensemble-based correlations showed that a more active convection and stronger cyclonic circulation corresponded to a northward shift of the main precipitation band. The results indicated that Prapiroon and the southern convective disturbances played important roles in the July 2018 heavy rain event and largely contributed to predictability.

Keywords: Data assimilation, Ensemble forecast, Heavy precipitation

