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Western Maritime Continent's Subseasonal Predictability of Rainfall Extremes and Implications on Water Resource Management

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In recent years, there have been numerous hydro-meteorological disasters in the Western Maritime Continent related to both extremely high rainfall and extremely low rainfall. For example, the December 2006 to January 2007 floods in the Southern Malay Peninsula were one of worst floods in the region causing at least 17 deaths, over 100,000 residents to be displaced, and more than 50,000 hectares of agricultural land was estimated to be damaged. On the other extreme end, the February-March 2014 large-scale drought significantly affected water supplies and agriculture activities in the Western Maritime Continent – a situation which was later severely compounded by the 2015-16 strong El Nino. The advent of subseasonal predictions in recent years opens up frontiers of research linking rainfall predictions with hydrological parameters, with the aim of improving predictions of hydro-meteorological extremes .

Riding on these developments in subseasonal predictions, we investigated the predictability of extreme rainfall conditions using the ECMWF model through a number of case studies spanning extreme high and low rainfall, which led to damaging floods and severe droughts respectively. A number of rainfall parameters (e.g. anomalies, number of dry days) in the ECMWF model were analysed for these studies. To understand the basis behind the ability of the models (or lack thereof) in predicting the events at appropriate lead times, the potential climatic drivers behind these events were also investigated. The ECMWF model demonstrated ability to predict these events satisfactorily and in most cases, the predictability of events could be explained by the presence of significant climatic drivers that are well predicted by the model (e.g. MJO). The challenge remains, however, in making good use of the model's reasonable predictions to aid effective decision-making in water resource and disaster-risk management.