Interannual rainfall variability over the northwest Java, Indonesia

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Indonesia Maritime Continent is vulnerable to climate disasters such as drought and floods. Extreme dry events lead to devastating drought with losses in crop production. On the contrary, persistent heavy rains have lead to flooding and landslides over the region, which cause hardship for several hundred million people through their significant impact on economics and societies with loss of human lives and properties. Therefore, understanding of rainfall variability and its predictability over the region is essential to reduce the risk of climate disasters. The present study describes interannual rainfall variability over the northwest Java island using reanalysis data and hindcast results from a coupled general circulation model known as the Scale Interaction Experiment-Frontier Research Center for Global Change (SINTEX-F) for the period 1982-2010. To begin with, the observed annual variability of Java rain index is derived by taking area average over the same domain as that of the model index (i.e. 106.25-107.750E; 6.75-6.250S). The model simulates the Java rain and its variability quite realistically with a wet season that peaks in January and a dry season that peaks in August. In this study we investigate the impact of the large-scale climate variability such as El Niño-Southern Oscillation (ENSO) and Indian Ocean dipole mode (IOD) events on the Java rain. In order to separate the influence of IOD and ENSO on Java rain, a partial correlation technique is employed. The partial correlation between the Java rain and sea surface temperature anomalies around Indonesia shows higher positive correlation (about 0.6) when the influence of ENSO is removed. This is also confirmed by the partial correlation between the Java rain and sea level pressure anomalies. Therefore, the analysis of model result reveals that the influence of the IOD on Java rain is significantly as large as the influence of ENSO. The SINTEX-F results can provide skillful forecast rainfall at 3-month lead in northwest Java.