



Variability of precipitation extremes in Serayu Watershed, Indonesia

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Precipitation extremes have triggered severe natural disaster (floods and droughts) in Serayu Watershed, Indonesia causing casualties and loss over recent decades. Understanding spatio-temporal features of precipitation extremes is vital for designing mitigation measures. In this study, variability of precipitation extremes of Serayu watershed in space and time is presented. We specifically focused analysis on annual maximum, 3-day total maximum and 7-day total maximum precipitation over the study region. In here, Principal Component Analysis (PCA) was employed to isolate dominant modes of variability. Moreover, we exercised with Self Organizing Map (SOM) method to visualize the complex structure of precipitation extremes in time and space into two dimensional topological map. We took the year of highest and lowest extremes detected from PCA to train the SOM model. Moreover, we performed Copula analysis to summarize the conditional dependence among extreme events in a spatial domain useful for particularly estimating precipitation extremes in unobserved sites. Particularly, we conducted the Copula analysis on the first principal component (PC) obtained from PCA. The result shows that the first PC captures 18%, 24% and 23% of variability for annual maximum, 3-day total maximum and 7-day total maximum of precipitation respectively. In addition, the first PC captures more variability than spatial mean of the events. Furthermore, we observed quite similar feature of heatmap from SOM model between annual maximum, 3-day total maximum and 7-day total maximum of precipitation. Additionally, we detected high structural dependence among those precipitation events from Copula analysis. The study is underway and additional analysis will be performed.