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Abstract: Changes in hydrological processes due to rising temperatures and related effects on the socio-economy and people's livelihood are major concerns in Bangladesh. A study has been performed to assess the effects of increasing temperature on the groundwater levels and consequent changes in irrigation costs for groundwater-dependent irrigated agriculture in Northwest Bangladesh. A support vector machine (SVM) was used to model the temporal variations in groundwater level from rainfall, evapotranspiration, groundwater abstraction, and agricultural return flow. A multiple linear regression (MLR) model was developed to define the functional relationship between irrigation costs and groundwater levels. The model showed that average groundwater level during the major irrigation period (January-April) decreased by 0.15-2.01 m due to an increase in temperature of 1-5°C, which increased irrigation costs by 0.05-0.54 thousand Bangladesh Taka (BDT) per hector.

Abstract: The few previous studies of precipitation isotopes ($\delta^{18}O$ and δD) in Indonesia, based on low spatial resolution observation datasets, have found several types of patterns in their seasonal variabilities. This study conducted high spatial resolution rainfall sampling and investigated the temporal characteristics of precipitation isotope in Indonesia. Rainfall samples were collected weekly from 33 stations in Indonesia. Cluster analysis showed that Indonesia could be divided into four types based on the seasonal variability of the precipitation of $\delta^{18}O$. The majority of stations showed seasonal patterns in the variability of $\delta^{18}O$, characterized by high values in the dry season (July-October) as type 1. Type 2 also showed one peak of high $\delta^{18}O$ but in the longer period (June-November) was similar to type 1 stations. A region of Northwest Indonesia, comprising North and Central Sumatra and western Borneo, was identified as type 3, having two peaks of high $\delta^{18}O$ values in January-February and May-August. Another pattern of variability was the anti-monsoonal type, indicated by low $\delta^{18}O$ in May-July found in east part of Indonesia. Asia-Australia monsoon regime was the main factor that controls seasonal $\delta^{18}O$ variability. This research showed that stable isotope in precipitation could correspond to precipitation climatology in Indonesia.

Jakarta, Indonesia 99-105

Abstract: Jakarta is facing several issues related to flooding, including land subsidence in the coastal area and rapid land-use/cover changes in the upstream area. In this study, we analyzed the effects of future changes in land use and land subsidence using a rainfall-runoff and flood inundation model. The future land-use scenarios were projected based on the SLEUTH model, and land subsidence was projected based on an extrapolation of the current state in Jakarta.

Based on this analysis, land-use changes and land subsidence contributed to an increase in flood inundation volume of 36.8% from 2013 to 2050. Moreover, the effects of land-use changes on flood inundation in Jakarta were much greater than those of land subsidence. The government' s current target to stop land subsidence by 2020 would cause a 7.7% decrease in the flood inundation volume by 2050. Furthermore, controlling and regulating land-use/cover changes by 2020 would cause a 10.9% decrease in the flood inundation volume by 2050. From these results, we conclude that a flood mitigation plan should be made not only for land subsidence, but also for land-use changes.