Generation of Hydrometeorological Data in Land Surface Model Based Detailed Soil Properties over the Korean Peninsula

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This Quantifying hydrometeorological information such as precipitation, soil moisture, evapotranspiration, and runoff, which can lead to improving the accuracy of flood/drought forecasting, is highly important. In this regards, many studies have attempted to generate hydro-meteorological information by using land surface model (LSM), and have emphasized the parameters that is affected to the output data. This paper evaluates the impacts of soil properties and related parameters using detailed soil properties in hydrometeorological information generation system developed by National Institute of Meteorological Research with TOPmodel based Land-Atmosphere Transfer Scheme (TOPLATS) conducted hourly simulated values in 5 x 5 km^2 resolution. Simulated data with two different parameters settings, one by universal soil texture with 11 categories and the other by 405 soil type data provided by National Academy of Agricultural Science, are validated with observed data from two flux towers at An-Dong basin, Korea. The input forcing data to drive the TOPLATS model are from Korea Meteorological Administration Digital Forecast System, Korea Local Analysis and Prediction System, and Automated Synoptic Observing System. Comparison between two different soil properties, soil moisture component from detailed soil properties shows high correlation between observed data at 50 cm. Also its spatial distribution shows larger variation in nationwide, and represents better local characteristics of hydro-meteorological components. The actual evapotranspiration, on the other hands, shows no significant difference between two different soil properties settings. This study attempts to evaluate the impacts of the usage of high-resolution detailed soil data on LSM simulation over the Korean Peninsula. The result would highly favorable for flood/drought forecasting in nationwide, however, it needs to be verified against a number of observation sites as a future work.

Key words: Land surface model, TOPLATS, Soil properties