Soil Moisture Field Generation Using a Data Mining Technique and Ancillary Data

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A soil moisture estimation method was developed to calculate the nationwide soil moisture fields using on site soil moisture observation, rainfall, surface temperature, MODIS NDVI, MODIS LST, land cover, effective soil depth, and a data mining technique, CART(Classification And Regression Tree) algorithm. The model was applied to the Yong-dam dam basin since the soil moisture network data of the Yong-dam dam basin are reliable. Soil moisture observations of 4 sites were used for training the model and that of other 2 sites were used for the model validation. The average correlation coefficient between soil moisture observation and estimation of the validation sites is about 0.87. Results show that soil moisture estimation using a data mining technique and ancillary data allow us to get reasonable soil moisture field which is suitable for hydrologic model application. The model applied to estimate the nationwide soil moisture field. Results show that even though there are limitations of the lack of reliable soil moisture observation for various land use, soil, and topographic conditions, the soil moisture estimation method using ancillary data and CART algorithm should be a reasonable approach since the model provided proper soil moisture field estimations and represented soil moisture behavior well.