

## Comparative study on Potential Evapotranspiration (PET) estimation for catchment hydrological simulation: a case of Fuji River Basin

○Ma Wenchao(University of Tsukuba, Graduate School of Life & Environmental Sciences),  
Yamanaka Tsutomu(University of Tsukuba, Terrestrial Environment Research Center (TERC))

Understanding the impact of climate variability on hydrological cycles is critical for water resources management acknowledging the hydrologic process in specific catchment. Within hydrologic process, potential evapotranspiration (PET) through land surface-atmosphere feedback mechanisms, offer an alternative way to investigate the impact of climate variability on hydrological cycles (Horton, 1933; Bouchet, 1963; Budyko, 1974). For attribute the influence caused environmental conditions varied in daily-scale, three classical methods for estimating PET have been combined with SWAT model. SWAT is a complex quasi-physically based water quality model relying on numerous input files and parameters to represent hydrologic, climatic, water quality, management, plant, and soil processes within a watershed. The catchment is divided into sub-catchments in SWAT model, which gives the model the strength to better represent the properties of land uses and/or soils of each sub-catchment that have a significant effect on its hydrology. Three PET calculating models combined with SWAT are the temperature-based Hargreaves method (Hargreaves and Samani, 1985), radiation-based Priestley-Taylor method (Priestley and Taylor, 1972), and combination Penman-Monteith method (Penman, 1956; Monteith, 1965), which is helpful to compare the sub-catchment PET behavior under different methods and the sub-catchment landuse and soil characters.

The model have been calibrated by comparing the simulated reach discharge and observed discharge in different sub-catchments. Within the acceptable simulated result, PET calculated in daily step showed remarkable change among each day and regular change inter-annual. The result of Priestley-Taylor method show relatively lower among the three method results, and most of the result got by the result of Penman-Monteith method looks kind of higher than the others, meanwhile, the result of Hargreaves method among these two method referred above. The results of the PET by three methods have kind of relationship with the landuse and soil distribution, which have been concluded by SWAT as the statistical information.

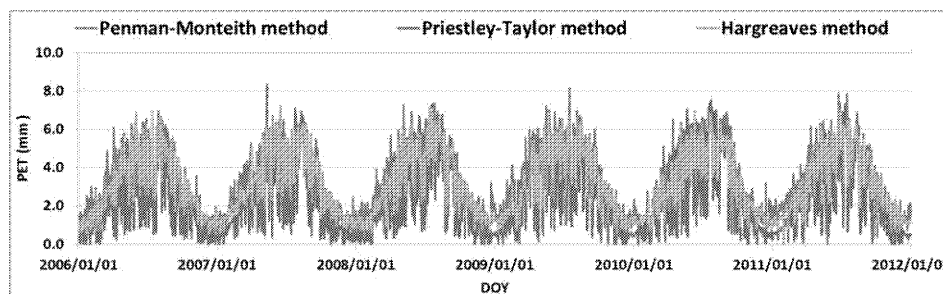


Figure.1 PET compare by using different methods