Geophysical Research Abstracts
Vol. 12, EGU2010-7900, 2010
EGU General Assembly 2010

Interspecies comparison of transpiration in Cambodia for the prediction of water use under the tropical monsoon climate

Makiko Tateishi (1), Yoshiyuki Miyazawa (1), Kumagai Tomo'omi (1), Vuthy Ma (3), Heng Sokh (3), and Nobuya Mizoue (2)

(1) Kasuya Research Forest, Kyushu University, Japan, (2) Faculty of Agricalture, Kyushu University, Japan, (3) Forestry Administration, Cambodia

Recently exotic fast-growing trees are planted in Southeast Asia, since economical profits of fast-growing tree plantations are expected. However, fast-growing species are also thought to consume more water than native species. There is concern these exotic species may influence water resources because of their large water consumption, especially during the dry season. In Cambodia there is a clear rainy season and extremely dry season with hardly any rainfall. Whether fast-growing trees adapt to such dry season and their effect on water resources is unconcern. To evaluate the impact of planting exotic trees, it is critical to know how much water these trees transpired and how they control water use under drought condition. To more thoroughly understand these processes, water flow was monitored in the stem of 4 species continuously using sap flux measurement to estimate transpiration of individual trees. For this experiment, we selected 6 trees of each species; two native species (Dipterocarpus obtusifolius and Shorea roxburghii) and 2 exotic species (Acacia auriculiformis and Eucalyptus camaldulensis). Meteorological observations were also conducted. All species had similar transpiration rates under the same environmental condition in the rainy season. Although there was a relationship between tree size and transpiration, difference among the tree species was not clear. That is to say, the difference of transpiration between small size trees and large trees was larger than interspecies variation in that period. From long-term observations, we found that transpiration of native and exotic species in the dry season show different responses to environmental conditions. While transpiration of A. auriculiformis slightly decreased during the dry season, the transpiration rate of S. roxburghii, a native species, remained high despite diminished groundwater at the end of the dry season. This result implies S. roxburghii develops deeper roots to access groundwater for supporting higher transpiration rate compared to A. auriculiformis.