[EE] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-HW Hydrology & Water Environment

[A-HW22]Hydrological Cycle and Water Environment

convener:Seiya Nagao(Institute of Nature and Environmental Technology, Kanazawa University), Isao Machida(Geological Survey of Japan), Shin'ichi Iida(国立研究開発法人森林研究・整備機構森林総合研究所森林研究部門森林防災研究領域水保全研究室, 共同), Takeshi Hayashi(Faculty of Education and Human Studies, Akita University)

Thu. May 24, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

We focus on various issues of water cycle and environment and aim to answer questions of hydrological and earth system sciences including 1) surface, subsurface and evapotranspiration processes of water cycle; 2) natural and anthropogenic hydrothermal systems, 3) environments issues and studies on a watershed or global scale, 4) water-related issues with ecological, environmental, and geochemical aspects, and 5) other issues in hydrological sciences. This session welcomes presentations regarding various kinds of approaches and techniques such as field survey, remote sensing, isotope tracers, numerical simulation, and theoretical analysis.

[AHW22-P02]Stemflow and canopy structure: revelations from the NIED large-scale rainfall simulator

*Shin'ichi Iida[1], Delphis F. Levia[2], Kazuki Nanko[1], Xinchao Sun[3], Yoshinori Shinohara[4], Naoki Sakai[5]

(1.Department of Disaster Prevention, Meteorology and Hydrology, Forestry and Forest Products Research Institute, 2.Departments of Geography and Plant &Soil Sciences, University of Delaware, 3.Institute of Surface-Earth System Science, Tianjin University, 4.Department of Forest and Environmental Sciences, University of Miyazaki, 5.Storm, Flood and Landslide Research Division, National Research Institute for Earth Science and Disaster Resilience)

Keywords:Stemflow, Canopy structure, Rainfall simulator

Stemflow plays an important role in both the hydrologic and elemental cycling of forest ecosystems. Although the amount of stemflow is relatively minor compared with the amount of throughfall, significantly concentrated inputs of stemflow water around tree bases have notable effects on near-trunk water dynamics and soils. Thus, the main factors controlling the amount of stemflow should be well understood. However, our knowledge of stemflow generation still has gaps because stemflow yields are affected by a myriad of interacting factors- the amount and the intensity of rainfall, and by differences in canopy structure among and within species, including leaf type, branch angle, and trunk lean, among other factors. In order to better understand the factors controlling stemflow funneling ratios among trees with differing canopy structures, we used the large-scale rainfall simulator at the National Research Institute for Earth Science and Disaster Resilience (NIED) with planted trees to measure stemflow under an artificially controlled environment with six different rainfall intensities (15, 20, 30, 40, 50, and 100 mm/h). Test tree species were *Cryptomeria japonica* D. Don (Japanese cedar), *Chamaecyparis obtusa* (Siebold &Zucc.) Endl. (Japanese cypress), and *Zelkova serrata* Thunb. (Japanese zelkova). We measured the detailed canopy projection areas for both foliated and defoliated conditions, branch number, and trunk lean via LiDAR and manual measurement techniques. Under controlled meteorological conditions, funneling ratios showed complex and different trends with respect to canopy structure. Hence, we used a Bayesian framework to obtain the relative influence of various canopy structural metrics. The preliminary results revealed that diameter at breast height and total amount of biomass were the two most influential factors affecting the funneling ratio among six test trees under foliated conditions. On the other hand, the differences in funneling ratios among defoliated six trees were mainly controlled by branch angle. Because raindrops directly contact with the surfaces of branches and stem

without leaves, branch angle would have a relatively large influence on stemflow generation. These findings will contribute to better understanding the rainfall interception process, especially for its seasonality and dependency on tree species.