International Session (Oral) | Symbol A (Atmospheric, Ocean, and Environmental Sciences) | A-HW Hydrology & Water Environment

[A-HW07_29AM1]Insight into change and evolution in hydrology

Convener:*Makoto Tani(Division of Environmental science and Technology, Graduate School of Agriculture, Kyoto University), Yuki Matsushi(Disaster Prevention Research Institute, Kyoto University), Shoji Noguchi(Forestry and Forest Products Research Instiute), Eiichi Nakakita(Disaster Prevention Research Institute, Kyoto University), Chair:Shoji Noguchi(Forestry and Forest Products Research Instiute), Makoto Tani(Division of Environmental science and Technology, Graduate School of Agriculture, Kyoto University)

Tue. Apr 29, 2014 9:00 AM - 10:45 AM 511 (5F)

Fluctuations in the water and chemical cycles icluding floods, droughts, and water-quality impacts are influeced by long-term changes and/or evolutions in catchment properties and climate conditions. For example, to predict stormflow responses only from the cachment topography is difficult because the runoff mechanism is strongly controlled by bedrock-weathering and soil-evolution processes. Such a concept of change and evolution is raised by IAHS, called 'Panta Rhei,' as its decadal intiaitive from 2013 following PUB (Predictions in ungauges basins), and the international disscussions have started. http://distart119.ing.unibo.it/pantarhei/?q=node/1 In paralle with this activity, we are now conducting a project on dependences of rainfall-runoff responses on a temporally-nested structure of topographic, soil, and vegetation developments under the JSPS budget from 2011 to 2015. In this session, presentaions addressing effects of natural changes and their interactions on the water and chemical cycles are encouraged, and chaneges originated from human influences including the disturbances and managements are also welcomed.

10:33 AM - 10:45 AM

[AHW07-P05_PG]Variation in groundwater-stream water interaction with season: focus on water level, temperature and chemistry

3-min talk in an oral session

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Keywords:hyporheic zone, interaction, groundwater, piezometer, Korea

This study was conducted to reveal seasonal variations of the groundwater and stream water interaction in Gangwon province of Korea using analyses of measured water levels, water temperature and water chemistry from August to November of 2013. For measuring the water levels in the hyporheic zone, four piezometers (IYGW-1~4) were installed at depths of 0.830~1.565 m below stream bed, perpendicular to stream flow direction and the stream level was also measured at IYSW-1. The water level and water temperature were measured every hour using an automatic logger (DIVER). In addition, nearby groundwater, hyporheic water and stream water were collected for ion and stable isotope analyses in the wet (September) and dry seasons (November) along with field measurements of pH, EC, DO and ORP. The water levels of the piezometers generally increased with rainfall, and they were lower than the stream water level in September, indicating a losing stream, but the former was higher than the latter in November, indicating a gaining stream. The reversal of the heads occurred at October 10. The stream water temperature (IYSW-1), directly affected by the surrounding air, was between 0.9~22.9℃ with a large fluctuation. However, the hyporheic water (IYGW-4; 1.565 m depth) showed a small range of

13.2~17.8℃. The water temperature at IYGW-4 was lower than those of the other piezometers but the reversal of the water temperatures also occurred at October, like the water levels. The groundwater, hyporheic water and stream waters were all classified as Ca-HCO_3 type by Piper diagram, which is indicative of effect of ambient air. The EC of IYGW-4 was the highest (136.7 μ S/cm), indicating relatively higher influence of the groundwater. This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (NRF-2011-0007232).