Insight into change and evolution in hydrology
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Tue. Apr 29, 2014 9:00 AM - 10:45 AM  511 (5F)
Fluctuations in the water and chemical cycles including floods, droughts, and water-quality impacts are influenced by long-term changes and/or evolutions in catchment properties and climate conditions. For example, to predict stormflow responses only from the catchment 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 initiative from 2013 following PUB (Predictions in ungauged basins), and the international discussions have started.
http://distart119.ing.unibo.it/pantarhei/?q=node/1 In parallel 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, presentations addressing effects of natural changes and their interactions on the water and chemical cycles are encouraged, and changes originated from human influences including the disturbances and managements are also welcomed.

10:33 AM - 10:45 AM

Groundwater levels and qualities in megacities of Korea
3-min talk in an oral session
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Keywords: groundwater levels, qualities, metropolitan cities, contaminants, Korea

This study was conducted to evaluate the groundwater levels and groundwater qualities in six metropolitan cities (Seoul, Busan, Daegu, Incheon, Daejeon and Ulsan) of Korea. For this purpose, we collected the groundwater level data of 2001-2011 from the Korean National Groundwater Monitoring Stations in the cities and semi-annual groundwater quality data analyzed by the Korean Ministry of Environment for the same period. Using these collected data, we analyzed the change in the water levels in and outskirt of the cities and in groundwater qualities in the cities. The groundwater levels in the outskirt were generally higher (0.84-15.66 m bgs), compared with those in the central part of the city (3.89-75.16 m bgs), and well responded with the seasonal rainfall (higher in the summer but lower in the winter). However, the groundwater levels in the central part of the city were largely affected by pavement, deep underground building such as subway, and artificial pumping, not by the seasonal effect. The six metropolitan cities showed ranges of 0-507 mg/L and 0-22,000 mg/L for NO3-N and coliform, respectively. In addition, groundwater contamination with TCE (0.00-4.50 mg/L), PCE (0.00-0.48 mg/L) and 1.1.1 TCA (0.00-0.11 mg/L) was also found. The groundwater contamination with these contaminants was relatively severe especially in Seoul and Busan, which may be attributed to their high densities of populations and industrial facilities. This research was supported by Basic Science Research.
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