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

[A-HW20]Materials transport and nutrient cycles in watersheds; Human and climate impacts

convener:Mitsuyo Saito(Graduate School of Environmental and Life Science, Okayama University), Shin-ichi Onodera(Graduate School of Integrated and Arts Sciences, Hiroshima University), Takahiro Hosono(熊本大学大学院先導機構, 共同), Adina Paytan(University of California Santa Cruz)

Mon. May 21, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

This session aims to synthetize watershed sciences in order to understand dynamical processes of materials transport and nutrient cycles in watersheds from headwaters to coastal seas focusing on human and climate impacts. The session will be integrating a variety of research disciplines including limnology, ground water hydrology, coastal oceanography, meteorology, pedology, sedimentology, forestry, agriculture, fishery, social science and more. The watershed sciences also challenge us to solve environmental issues emerged in the watersheds through our profound understanding of relations between humanity and nature. For instance, on one hand, human land uses alter water resources, dynamics of sediments, nutrients and pollutants in waters and soils on watershed scales, while changing climates may alter water cycle, the frequency and intensity of materials transport and natural disaster, sometimes having catastrophic effects on the watershed systems. This session also calls for ideas on new methods for the watershed sciences, such as tracer and molecular technique, hydrological modeling, paleontological approaches, laboratory and field experiments, social-scientific evaluation of ecosystem services and social-ecological systems, and so on, in order to elucidate physical, chemical and biological mechanisms for shedding light on natural phenomena and their changes over time in complex and dynamic watershed systems. Through this session, we would like to facilitate interdisciplinary collaboration among participants to create new knowledge on watershed sciences.

[AHW20-P17]Nitrate Dual-Stable Isotope Analysis Identifies Sources of Groundwater Nitrogen Pollution in the Silang-Sta. Rosa Subwatershed of Laguna de Bay

*Osbert Leo Alcantara Privaldos[1,2], Ken'ichi Osaka[3], Yoshitoshi Uehara[4], Asano Satoshi[5], Lei Fujiyoshi[4], Chikage Yoshimizu[4], Ichiro Tayasu[4], Adelina C. Santos-Borja[1], Maria Pythias B. Espino[2], Noboru Okuda[4]

(1.Laguna Lake Development Authority, 2.Institute of Chemistry, University of the Philippines-Diliman, 3.The University of Shiga Prefecture, 4.Research Institute for Humanity and Nature, 5.Lake Biwa Environmental Research Institute)

Keywords:nitrate stable isotopes, denitrified method, Silang-Sta. Rosa subwatershed

Excess nitrogen in freshwater systems contributes to water quality degradation and eutrophication. Nitrates (NO_3^-) in river and ground waters are constantly turned over by internal biogeochemical processes. Dual-stable isotope measurement provides conclusive information in tracing NO_3^- sources and forms. Signatures of nitrate stable isotopes ($d^{15}N$, $d^{18}O$) in the river and ground waters of Silang-Sta. Rosa subwatershed – measured using denitrifier method. Nitrate sources in the study site were ammonia (NH_4^+) from fertilizer and precipitation, soil NH_4^+ in the upstream and midstream, and manure and septic waste in the downstream area both in river and ground waters. The concentrations of nutrients and metals were also analyzed to determine the anthropogenic activities, industrialization, and urbanization effects in the subwatershed. The movement of water between river and ground waters provides a pathway for chemical transfer such as nutrients between terrestrial and aquatic systems. Principal component analysis of these concentrations shows that the movement of ions in ground waters is from upstream to downstream. This suggests chemical

contamination caused by nitrate fertilizers used in farming lands in the upstream affecting the characteristics of aquatic systems by altering biogeochemical processes, especially in the downstream area.