[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-P25]Observation for the groundwater inflow to the lagoons connected to Lake Biwa

*Mitsuyo Saito[1], Shin-ichi Onodera[2], Yusuke Tomozawa[2], Kunyang Wang[2], Syuhei Ban[3], Noboru Okuda[4]
(1.Graduate School of Environmental and Life Science, Okayama University, 2.Graduate School of Integrated Arts and Sciences, Hiroshima University, 3.The University of Shiga Prefecture, 4.Research Institute for Humanity and Nature)
Keywords:Groundwater inflow, Connected lagoons, Lake Biwa

There are more than 20 lagoons around Lake Biwa which were originally a part of the lake. These lagoons are regarded to have important functions as settling ponds of inflowing loads from the catchments to Lake Biwa, refuges for shallow water ecosystems and so on. Because these lagoons are connected to Lake Biwa, evaluation of nutrient budget is important for the nutrient cycle in the lake. Groundwater inflow is one of the potential nutrient paths from a catchment to water environments. Some researchers have pointed out the presence of lacustrine groundwater discharge (LGD) in littoral area of Lake Biwa. However, it has not been evaluated for the lagoons around the lake. In the present research, we aimed to examine the groundwater inflow to the lagoons connected to Lake Biwa using the multi-tracer method.

The field campaign was conducted in December 2017 for two lagoons (Noda-Numa and Hasu-Ike) located on northeastern shore of Lake Biwa. The volume of inflow and outflow, water temperature, electric conductivity, chlorophyll-a and radon (^{222}Rn) concentration were measured in these lagoons. ^{222}Rn is a radioactive element of uranium (^{238}U) series with 3.8 day of half-life. ^{222}Rn is a useful tracer of

groundwater discharge because it generally enriched in groundwater than surface water. Water samples were collected at the inlet, outlet and near the center of the lagoons and natural springs and groundwater wells around the lagoons. Also bottom sediment samples were collected in the lagoons. These samples have been analyzed for nutrients (nitrogen, phosphorus and silicate) and stable isotope ratios of oxygen and hydrogen (δ^{18}O and δD) for water.
δ^{18}O and δD for water were plotted on the different meteoric lines between Noda-Numa an Hasu-Ike. This result suggests these water are originated from different watersheds with different groundwater flow systems. Besides, these values were lower at the inlet than the center and outlet of the lagoons and was lowest in the groundwater around the lagoons. These results suggest the presence of groundwater inflow to these lagoons and the signal decreased from the inlet to the outlet.