[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-P16]A preliminary study of redox conditions of groundwater in the coastal area of Indramayu, Indonesia

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Keywords:coastal area, groundwater, redox conditions, sulfate reduction

The redox condition of groundwater is determined by the interaction between water, minerals, and organic matter. It plays an important role in preserving water quality and changes with environmental conditions. The redox condition varies with temperature in the subsurface due to the ground source heat pump system. Air conditioning due to the ground source heat pump system is reported as an effective energy saving technique even in tropical areas, where the difference between the subsurface and the atmospheric temperature is low. A rise in the use of air conditioning associated with ground source heat pump system is expected to elevate temperature in the subsurface. It is important to evaluate the redox condition with regards to the conservation of groundwater quality in tropical areas. This research evaluated the redox conditions of groundwater in the coastal area of Indramayu in Indonesia.

The Cl⁄Br ratio of samples from the groundwater demonstrates rising salinity due to f seawater intrusion. The mixing ratio of seawater and groundwater was evaluated by setting the Cl^- concentration of seawater to 19500 ppm and that of the unaffected groundwater to 16 ppm, with a maximum mixing ratio of 62%. The SO_4^{2-} concentration of the groundwater affected by seawater was calculated and

compared to the measured value. A measured SO_4^{2-} concentration lower than the calculated value was associated with sulfate reduction and vice versa. Sulfate showed weak correlations with the DOC, Fe and Mn concentrations of the groundwater. Sulfate reduction showed a strong correlation to the sampling depth, with no reduction at depths below 20 m. Further work is required to better understand the relationship between the measured and the calculated SO_4^{2-} concentrations, as well as the geology of the region.