[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-P01]Application of Model for Prediction Across Scales in Drought Index and Reservoir Inflow Estimation

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Keywords:seasonal forecast, water resource management, MPAS, reservoir inflow prediction

The topography of Taiwan is precipitous that the river flows is usually short and rapid. Moreover, Taiwan is an area prone to suffer droughts due to uneven temporal distribution of precipitation and small storage capacity of reservoirs, although the total rainfall amount is plentiful, the water resource is difficult to reserve. With the significant impacts of climate change - causing drought and floods to be more frequent in recent years. The seasonal rainfall forecasts with dynamic model outputs become an important issue for water resource management in Taiwan. The new high-resolution global model, “Model for Prediction Across Scales” (MPAS) is used for this study to develop seasonal precipitation prediction. The meteorological and hydrological model are further integrated in this study for drought index and reservoir inflow estimation. The results showed using different combinations of physics schemes in MPAS can build up an ensemble system for seasonal rainfall forecast and reservoir inflow forecast. But there are still uncertainties in MPAS for long-term forecast. However, the ensemble system is able to produce probability forecast of reservoir water level in the future. These information can help the authorities to make decisions in water resources planning and droughts warning.