
[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 synthesize 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-P02]Daily rainfall forecasting through an ensemble numerical weather prediction system with an AI-based integration strategy

*Ming-Chang Wu¹ (1.Taiwan Typhoon and Flood Research Institute, National Applied Research Laboratories, Taiwan)

Keywords:Daily rainfall forecasting, Ensemble numerical weather predictions, AI-based integration strategy

Typhoon rainfall is one of the most important water resources in Taiwan. However, heavy typhoon rainfall often leads to serious disasters and results in loss of lives and properties. To overcome this problem, the control of water by reservoirs is the most common measure. When a typhoon approaches Taiwan, the major goal of reservoir operation is to control floods. But as the typhoon leaves, the goal is changed to store sufficient water. To achieve these two goals, accurate typhoon rainfall forecasts are always required as an important reference for making appropriate reservoir operation decisions. In this study, by means of an ensemble numerical weather prediction system in Taiwan, the ensemble forecasts of typhoon rainfall are obtained. Furthermore, an artificial intelligence (AI) based strategy is developed to effectively combine these ensemble forecasts for providing better typhoon rainfall forecasts. To verify the performance of the proposed strategy, actual application is conducted to provide typhoon rainfall forecasts with a lead time of 1 to 3 days. The results indicate that the proposed strategy provides more accurate forecasts as compared to the simple mean of all ensemble forecasts. In

conclusion, through the proposed strategy as well as the ensemble numerical weather prediction system, improved typhoon rainfall forecasts are obtained. The improved rainfall forecasts are helpful for making appropriate reservoir operation decisions during typhoons.