Objectives and Overarching Key Questions of AsiaPEX

***Toru Terao**
terao@ed.kagawa-u.ac.jp
Faculty of Education, Kagawa University, Kagawa, Japan.
Shinjiro Kanae
School of Environment and Society, Tokyo Institute of Technology, Tokyo, Japan
Jun Matsumoto
Department of Geography, Tokyo Metropolitan University, Tokyo, Japan
Japan Agency for Marine-Earth Science and Technology, Kanagawa, Japan

Asian precipitation Experiment (AsiaPEX) was just launched in 2019 as a prospective Regional Hydroclimatological Project (GHP) under the Global Energy and Water Exchanges (GEWEX) framework. It is the successor of past Asian GHPs, the GEWEX Asian Monsoon Experiment (GAME, 1996-2005) and the Monsoon Asian Hydro-Atmosphere Scientific Research and Prediction Initiative (MAHASRI, 2006-2016).

Asian monsoon is one of the most prominent hydroclimate systems on the current earth. It affects huge population over Asian Continent and surrounding area. As the global climate change accerelates, future projection of the hydroclimatological condition of Asian monsoon became public great concern. However, our ability to reproduce monsoon climate in the climate models are poor. Recent efforts to clarify the limitation of climate models in reproduction elucidated the severe error in spatio-temporal distribution of monsoon rainfall, and importance of land surface impact through the latent heat flux. Highly heterogeneous topography and land cover interacts with nonlinear response of atmospheric deep convections. Societal needs now urge research community to establish useful, i. e. reliable climate projection including estimates of impacts on human life.

The mission of the AsiaPEX is improvement of our ability for reliable future projection of Asian monsoon system. Our general objective is to understand the precipitation over diverse hydroclimatological conditions over land for better prediction, disaster reduction and sustainable development. Six approaches of the AsiaPEX are as follows, 1) Estimation of variation and extremes in Asian precipitation, 2) Process studies of Asian precipitation focusing on diverse land-atmosphere interactions, 3) Understanding and prediction of variability of Asian monsoon from subseasonal to interdecadal time scales, 4) High resolution land surface hydrological modeling incorporating impacts of human water withdrawal, agriculture, vegetation and cryosphere, 5) Coordinated observation and modeling initiatives, and 6) Detection and projection of the climate change impact on regional precipitation in the Asian monsoon region.