Geophysical Research Abstracts
Vol. 14, EGU2012-13021, 2012
EGU General Assembly 2012

Boundary Condition Transfer from Global Atmospheric Model to Local Flood Inundation Model

H. Kim (1,2), B. Kim (1), Z. Liu (3), D. Yamazaki (2), B. Sanders (4), T. Oki (2), J. Famiglietti (1,3,4)

(1) University of California Center for Hydrologic Modeling, Irvine, USA (hyungjun@uci.edu), (2) Institute of Industrial Science, The University of Tokyo, Tokyo, Japan, (3) Department of Earth System Science, University of California, Irvine, USA, (4) Department of Civil and Environmental Engineering, University of California, Irvine, USA

Flooding is one of the most common natural disasters. It has been a matter of concern and interest in the history of Hydrology. Various methodologies have been developed to approach the issue. Since the capability of models and available data have not been enough, in general, using site-specific fine-tuned models and/or establishing a flood inundation map as a non-structural measure have been used in local societies, in order to predict and prevent damage from abnormal flooding over the design criteria of hydraulic structures. However, under changing climate, the global hydrologic cycle has been altered and the spatiotemporal pattern of natural extremes also has been modified, which reduces the credence of the estimated model parameters and inundation maps based on historical records.

In this study, the transfer of information between different spatiotemporal scales from global through local is evaluated. The proposed modeling framework uses multiple modeling system and observational datasets, which are tested in different sites including the Amazon and the San Gabriel River. The Japanese 25-year Reanalysis (JRA-25) data is used to retrieve reliable large scale climate variability. Monthly bias in the reanalysis precipitation field is corrected using ensemble products of global observations such as GPCC and PREC/L. The Shuttle Radar Topography Mission (SRTM) and National Hydrography Dataset Plus (NHD+) are exploited to describe topography in regional and local simulations. The BreZo hydrodynamic model which solves 2 dimensional shallow-water equations to predict flood wave propagation is employed in local high resolution ($\sim$100m) simulations. Regional scale hydrologic simulations are compiled using the Minimal Advanced Treatments of Surface Interaction and RunOff (MATSIRO) with Catchment-based Macro-scale Floodplain model (CaMa-Flood) and the Catchment-Based Hydrologic and Routing Modeling System (CHARMS) coupled with the Community Land Model (CLM) 3.5.