Geophysical Research Abstracts
Vol. 19, EGU2017-1579-2, 2017
EGU General Assembly 2017

Uncertainty estimation of satellite rainfall products associated with spatiotemporal representation of extreme events

Miguel Laverde-Barajas (1,2), Gerald Corzo Perez (1), Dimitri Solomatine (1,2)

(1) UNESCO-IHE Integrated Water Systems and Governance, Delft, Netherlands (m.laverde@unesco-ihe.org), (2) Water Resources Section, Delft University of Technology, The Netherlands

Estimating the uncertainty of extreme events in rainfall products and analysing its propagation through the hydrological and hydrodynamic models in a flood study can contribute to a better assessment of flood risk. Characteristics of rainfall events such as magnitude, duration and spatial extension can be associated with the level of flood damages. This study estimates the uncertainty associated to Near-Real-Time (NRT) rainfall satellite products to capture spatiotemporal extreme events. We compare four NRT rainfall satellite products (CMORPH, PERSIANNGCCS, TRMM-RT and the Hydro-Estimator) against the Multi-Source Weighted Ensemble Precipitation MSWEP product in a subtropical catchment in southeastern Brazil during monsoon seasons from 2007 to 2014. The process of defining spatiotemporal events from these products follow three main steps: (1) calculation of a threshold for each cell time series using quantiles, (2) application of the threshold as a filter to transform values above and below the threshold in each cell of the rainfall product into a binary image, (3) clustering cell values using the connected component labeling algorithm to find spatial extension of events. By using the 90th quantile threshold as the extreme condition, four states of the rainfall events define types of extremes: (1) local and short duration events, (2) local and long duration events, (3) extensive and short duration events and (4) extended and long duration events. The uncertainty of each product to estimate events uses the probability of having events close to the reference model. The results show that events in the region are of the “extended with short durations” type, and most of the products result with the similar results. CMORPH had the lowest probability of event differences with our referenced rainfall product. The method allows for characterising spatiotemporal events obtained from NRT products. Further study will characterise regions of these events in a river basin, and at studying the propagation of their uncertainty through a hydrological and hydrodynamic flood modelling framework.