Geophysical Research Abstracts
Vol. 21, EGU2019-13771-1, 2019
EGU General Assembly 2019

The impact of satellite-based error sources for extreme rainfall events on the hydrological response

Miguel Laverde-Barajas (1,2), Gerald Corzo Perez (1), Remko Uijlenhoet (3), Dimitri Solomatine (1,2)

(1) IHE Delft Institute of water Education, Delft, The Netherlands (m.laverde@un-ihe.org, g.corzo@un-ihe.org, d.solomatine@un-ihe.org), (2) Delft University of Technology, Delft, The Netherlands, (3) Wageningen University, Wageningen, The Netherlands (remko.uijlenhoet@wur.nl)

Satellite-based rainfall products have been widely used for multiple hydrological applications such as flood monitoring, water management among others. However, their use and implementation have been marked for several sources of errors that needed to be investigated. Recently, spatiotemporal Continuous Object-based Rainfall Analysis (ST-CORA) was developed to evaluate the performance of satellite-based products. ST-CORA is based on a 3d object pattern recognition algorithm and links space and time rain events. The method allows for the estimation of different types of rainfall products errors (magnitude, pattern, displacement) by analysing the complete structure of a rainfall event in space and time. These source of errors play an important role in the response of the hydrological models and later on determining the level of damage associated with floods. In this research, we evaluated the hydrological response of multiple sources of rainfall products error in the catchment of the Capivari River Brazil using the distributed hydrological model Wflow-sbm. This model was calibrated and validated during 2016 using hourly information from the gauge-corrected weather radar rainfall and hourly discharges along the catchment. Using the ST-CORA method, errors of four types of rainfall events were obtained from the hourly Near Real-Time CMORPH product compared to gauge-corrected weather radar from 2007 to 2016. The results show errors in magnitude, displacement, and pattern affected the runoff shape and volume on the streamflow. Short rainfall events were affected more due to errors of displacement and pattern. This types of errors impacted mainly the shape and response of the streamflow. On the other hand, spatially extensive events were dominated by errors in magnitude which affected the streamflow volume. ST-CORA method provided an optimal error decomposition based on the temporal and spatial characteristics of extreme events.
Keywords: Satellite rainfall, Extreme events, hydrological model, object-based method, spatiotemporal analysis.