Geophysical Research Abstracts
Vol. 19, EGU2017-1183, 2017
EGU General Assembly 2017

A coupled hydrological-hydraulic flood inundation model calibrated using post-event measurements and integrated uncertainty analysis in a poorly gauged Mediterranean basin

Rouya Hdeib (1), Chadi Abdallah (1), Roger Moussa (2), and Francois Colin (2)

(1) CNRS-RS, Lebanese National Council for Scientific Research, Remote Sensing Center, Beirut, Lebanon, (2) INRA, UMR LISAH, Laboratoire d'étude des Interactions entre Sol – Agrosystème – Hydrosystème, 2 Place Pierre Viala, 34060 Montpellier CEDEX 1, France

Developing flood inundation maps of defined exceedance probabilities is required to provide information on the flood hazard and the associated risk. A methodology has been developed to model flood inundation in poorly gauged basins, where reliable information on the hydrological characteristics of floods are uncertain and partially captured by the traditional rain-gauge networks. Flood inundation is performed through coupling a hydrological rainfall-runoff (RR) model (HEC-HMS) with a hydraulic model (HEC-RAS). The RR model is calibrated against the January 2013 flood event in the Awali River basin, Lebanon (300 km2), whose flood peak discharge was estimated by post-event measurements. The resulting flows of the RR model are defined as boundary conditions of the hydraulic model, which is run to generate the corresponding water surface profiles and calibrated against 20 post-event surveyed cross sections after the January-2013 flood event. An uncertainty analysis is performed to assess the results of the models. Consequently, the coupled flood inundation model is simulated with design storms and flood inundation maps are generated of defined exceedance probabilities. The peak discharges estimated by the simulated RR model were in close agreement with the results from different empirical and statistical methods. This methodology can be extended to other poorly gauged basins facing common stage-gauge failure or characterized by floods with a stage exceeding the gauge measurement level, or higher than that defined by the rating curve.