Evaluating flood extent mapping of two hydraulic models, 1D HEC-RAS and 2D LISFLOOD-FP in comparison with aerial imagery observations in Gorgan flood plain, Iran

Abstract

We compared flood mapping techniques using a one-dimensional (1D) hydraulic model HEC-RAS and two-dimensional (2D) LISFLOOD-FP for a 10-km reach of Gorgan River in Iran. Both models were run using the same hydrologic input data. The input into the models was a steady discharge of 90 cm, corresponds to a flood peak occurred on March 25, 2012. Flood maps generated using these two models were compared with an observed flood inundation map, using F-statistic. The roughness coefficients of the models were calibrated by maximizing the value of the F-statistic. Based on the F-statistic, LISFLOOD-FP gives a slightly better result ($F = 0.69$) than HEC-RAS ($F = 0.67$). Visual comparison of the flood extents generated by the two models showed reasonably good agreement. Validation was done using a flood event occurred on May 31, 2014. The LISFLOOD-FP model gave a better result for validation as well. The 2D model showed more consistency in comparison with the 1D model.

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