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Error Propagation of Satellite-Rainfall in a Complex Terrain Basin

E. Anagnostou (1,2), E. Nikolopoulos (1,2), A. Papadopoulos (2), M. Borga (3), and M. Gebremichael (1)

(1) University of Connecticut, Civil and Environmental Engineering, Storrs, CT 06269, USA (manos@engr.uconn.edu, enikolop@engr.uconn.edu, mekonnen@engr.uconn.edu +1 860 486 6806), (2) Hellenic Center for Marine Research, Institute of Inland Waters, Anavissos, Greece (manos@ath.hcmr.gr, tpapa@ath.hcmr.gr), (3) University of Padova, Department of Land and Agroforest Environment, Padova, Italy (marco.borga@unipd.it)

The study evaluates the use of satellite rainfall for flood prediction applications in complex terrain basins. It focuses on a major flood event that occurred in October 1996 in a complex terrain basin of the northeastern region of Italy. A satellite rainfall error model is calibrated and used to generate rainfall ensembles based on two different satellite products and spatio-temporal resolutions. The generated ensembles are propagated through a distributed hydrologic model to simulate the hydrologic response. The resulted hydrographs are compared against the hydrograph obtained by using high-resolution radar-rainfall as the "reference" rainfall input. The error propagation of rainfall to stream runoff is evaluated for a number of basin scales that range from 100 to 1200 sqkm. The results from this study show that (i) use of satellite-rainfall for flood prediction depends strongly on the scale of application (catchment area) and the satellite product resolution, (ii) different satellite products perform differently in terms of hydrologic error propagation and (iii) the propagation of error depends on the basin size; for example, this studied shows that small watersheds (< 400 sqkm) exhibit a higher ability in dampening the error from rainfall-to-runoff than larger size watersheds.