



Flood hazard mapping using high-resolution Pleiades digital elevation model in the Ourika catchment (Morocco)

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The catchments in the High Atlas Mountains of Morocco, located upstream of the city of Marrakech, are prone to extreme floods caused by intense rainfall events. Such episodes are frequent and often devastating, such as the event of August 1995 that caused over than 200 fatalities in the Ourika river. The Ourika watershed (503 km²) has a complex and rugged topography, causing floods that can affect roads, agricultural and touristic areas. The goal of this work consists in characterizing the flood hazard by simulating the water levels and the lateral floodplain extension during floods. However the resolution and accuracy of digital elevation models (DEM) can strongly affect the hydraulic simulation results for predicting the effects of floods. Two digital elevation models (DEM) have been compared: the ASTER GDEM with a 30 m spatial resolution and a DEM derived from Pléiades stereoscopic imagery with a 4 m resolution. Using a hydraulic model (HEC-RAS), the extent of floods corresponding to different return periods are simulated and compared between the two DEM resolutions. Two areas are selected for the evaluation, characterized by different types of exposure: First a touristic area normally frequented by visitors, near to a regional road. The second zone selected is an agricultural sector on alluvial terraces where cultivated fields and infrastructures are vulnerable. Results showed that high-resolution Pléiades DEM provides an added value for the mapping of floodplains in complex terrain since it realistically represent the topography and allows a correct simulation of observed water levels.