



Flood hazard assessment in areas prone to flash flooding

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Contemporary climate projections suggest that there will be an increase in the occurrence of high-intensity rainfall events in the future. These precipitation extremes are usually the main cause for the emergence of extreme flooding, such as flash flooding. Flash floods are among the most unpredictable, violent and fatal natural hazards in the world. Furthermore, it is expected that flash flooding will occur even more frequently in the future due to more frequent development of extreme weather events, which will greatly increase the danger to people caused by flash flooding. This being the case, there will be a need for high resolution flood hazard maps in areas susceptible to flash flooding. This study investigates what type of flood hazard assessment methods should be used for assessing the flood hazard to people caused by flash flooding. Two different types of flood hazard assessment methods were tested: (i) a widely used method based on an empirical analysis, and (ii) a new, physically based and experimentally calibrated method. Two flash flood events were considered herein, namely: the 2004 Boscastle flash flood and the 2007 Železniki flash flood. The results obtained in this study suggest that in the areas susceptible to extreme flooding, the flood hazard assessment should be conducted using methods based on a mechanics-based analysis. In comparison to standard flood hazard assessment methods, these physically based methods: (i) take into account all of the physical forces, which act on a human body in floodwater, (ii) successfully adapt to abrupt changes in the flow regime, which often occur for flash flood events, and (iii) rapidly assess a flood hazard index in a relatively short period of time.