The use of sediment deposition maps as auxiliary data for hydraulic model calibration

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One aspect of the French disaster mitigation setup is the statutory Risk Prevention Plans (PPR, Plans de Prévention des Risques); i.e. spatial identification of potential disasters and mitigation measures. The maps are categorised into three zones depicting increasing disaster severity and potential mitigation measures (RTM, 1999). Taking the example of the city of Barcelonnette, in South France (French Alps), floods have been the most frequent occurring natural hazard (Flageollet et al., 1996). Consequently, a case is put forward for the need for accurate flood extent delineation to support the decision making process. For this study, the Barcelonnette case study was considered, whereby the last devastating flooding was in June 1957 (Weber, 1994). Contrary to the recent advances in the proliferation of data to support flood inundation studies (Bates, 2012; Bates, 2004; Di Baldassarre and Uhlenbrook, 2012; Schumann et al., 2009), constraints are faced when analysing flood inundation events that occurred before the 1970's. In absence of frequent flooding, the analysis of historical flood extents may play an important role in shaping the awareness of local stakeholders and support land-use and urban planning. This study is part of a probabilistic flood mapping (e.g. Di Baldassarre et al., 2010, Horrit, 2006) of the valley carried out in a Monte-Carlo framework, while taking into account the peak flow and the parametric uncertainty. The simulations were carried out using the sub-grid channel model extension of the LISFLOOD-FP hydraulic model (Bates et al, 2010; Neal et al., 2012). Sediment deposition maps (Lecarpentier, 1963) were used to analyse the model performance, additionally the graduation of the sediment deposition sizes showed the flood propagation and was used to analyse the model runs. However, there still remains the challenge of quantifying the uncertainty in the sediment deposition map and the actual flood extent.