Improving a DSM Obtained by Unmanned Aerial Vehicles for Flood Modelling

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Abstract. According to the EU flood risks directive, flood hazard map must be used to assess the flood risk. These maps can be developed with hydraulic modelling tools using a Digital Surface Runoff Model (DSRM). During the last decade, important evolutions of the spatial data processing has been developed which will certainly improve the hydraulic models results. Currently, images acquired with Red/Green/Blue (RGB) camera transported by Unmanned Aerial Vehicles (UAV) are seen as a good alternative data sources to represent the terrain surface with a high level of resolution and precision. The question is if the digital surface model obtain with this data is adequate enough for a good representation of the hydraulics flood characteristics. For this purpose, the hydraulic model HEC-RAS was run with 4 different DSRM for an 8.5 km reach of the Lis River in Portugal. The computational performance of the 4 modelling implementations is evaluated. Two hydrometric stations water level records were used as boundary conditions of the hydraulic model. The records from a third hydrometric station were used to validate the optimal DSRM. The HEC-RAS results had the best performance during the validation step were the ones where the DSRM with integration of the two altimetry data sources.

1. Introduction

Hydraulic models are essential tools for flood hazard prediction. These models need to be calibrated and validated, so monitoring the water levels flood events is important to improve flood hazard mapping. The representation of the terrain surface is another critical factor in the hydraulic flood modelling because it affects the flood hydrogram and the flood extent [1]. The spatial (horizontal and vertical)