Geophysical Research Abstracts,
Vol. 11, EGU2009-9049, 2009
EGU General Assembly 2009
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Hydraulic flood modeling using laser scanner data

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This work analyzes the altimetrical data and the effects of resolution on flood modeling. Two different terrain representations were considered: regular square cells (GRID) and Triangulated Irregular Network (TIN). Altimetry was obtained from a particular terrain representation called Model Key Point (MKP): this is a DTM obtained from the elaboration of laser scanner data, and it is characterized by high number of points in the areas with more elevation differences, and by few points in flat areas.
The accuracy of GRID and TIN data, obtained from MKP, was checked comparing them to the ground surveyed data. As well known hydrodynamic simulations need to represent the terrain morphology as input. Bi-dimensional hydraulic simulations were realized using different software and terrain representations obtained from MKP; the different results were compared afterwards. The use of bi-dimensional models to study flooded areas was increased with large diffusion of the high resolution Digital Terrain Model (DTM). However several models are not able to work easily and with reasonable simulation times when the DTM has a great deal of points. So some modifications of initial DTM are necessary and, in this work, the elaborations to reduce GID and TIN errors realized with Arcmap GIS are described too.
The studied area is the Ionian coastal plane of the Basilicata region (Southern Italy): here anthropic elements such as levees, roads and channels strongly influence the water motion of the floodplain; thus a careful description of these elements is necessary in order to obtain the hydraulic risk evaluation.