SIMULATION OF THE IMPACT CASE STUDY ON THE TOUS DAM-BREAK FLOW

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The Spanish Tous dam-break flow (1982) was chosen as a case study application for the "Flood Propagation" area of the IMPACT European project (Investigation of Extreme Flood Processes and Uncertainty, 2001-2004). This catastrophic event resulted, among other damages, in the flooding of the small town of Sumacárcel. A complete description of the test case can be found in Alcrudo and Mulet (2003, 2004).

This papers presents the computation of this test case and gives some comments on the results. Particularly, due to the extent of the valley and to the duration of the flood hydrograph (40 hours), simplifying options had to be made to obtain results in a reasonable computation time. The method used to build a mesh and to represent the buildings is described, as well as the assumptions regarding the upstream and downstream boundary conditions.

Two data sets are available for the bathymetry: the first one was set up in 1982, just after the event, and the second one dates from 1998, after the construction of the new Tous dam. Important differences can be observed between the two data sets, which has a signifcant influence on the computed results.

The town of Sumacárcel lies on a hill aside of the rio Júcar. Buildings located on higher parts of the hill did thus not need to be included in the computational domain. A preliminary run was performed on a coarse mesh with only 12276 triangles on the 1998 bathymetry, without representing the town. From there, the potentially inundated area in the town could be delineated, in order to select the buildings to be included in the refined mesh.

A first-order accurate finite-volume model is used to solve the 2D shallow-water equations. The fluxes are computed using Roe's scheme (Alcrudo and Garcia-Navarro, 1993; Soares-Frazão and Zech, 2002). The bed slope source terms are treated in a lateralised way (Soares-Frazão, 2002; Fraccarollo et al., 2003), which is somewhat similar to an upwind treatment (Bermudez and Vasquez, 1994). This technique appears to be very robust and yields good results on irregular topographies such as the present one. The friction term is computed using Manning's formula.

A qualitative cross-check of the maximum water level reached at the gauging points in the town, with the pictures provided in Alcrudo and Mulet (2003) seems to indicate that the computed results are plausible, although at some locations large differences appear between the results computed with the 1982 and 1998 bathymetry.

The extent of the inundated area is shown in Figure 1. The results computed with 1982 bathymetry seem to indicate a larger inundated area than was observed in the reality. The

results obtained with the 1998 bathymetry are closer to the observed flood extent, with underestimation especially in the urban area.

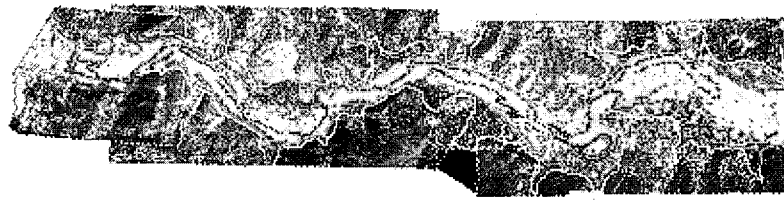

Fig. 1 Extent of the inundated area : —— real flood extent, —— river bed, computed with 1982 bathymetry, —— computed with 1998 bathymetry

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