Test 2 A & 2 B– Filling of depressions

1. Modelling performance tested

The test has been designed to evaluate the capability of each package to determine inundation extent and final flood depth, in a case involving low momentum flow over a complex topography.
This is divided into 2 tests **2A** and **2B** that differ in the rapidity of the inflow (although not in the total inflow volume).

2. Description

The area modelled, shown in Figure (a), is a perfect 2000 m x 2000 m square and consists of a 4 x 4 matrix of 0.5 m deep depressions with smooth topographic transitions. The DEM was obtained by multiplying sinusoids in the North to South and West to East directions and the depressions are all identical in shape. An underlying average slope of 1 : 1500 exists in the North to South direction, and of 1 : 3000 in the West to East direction, with a ~2m drop in elevation along the North-West to South-East diagonal.

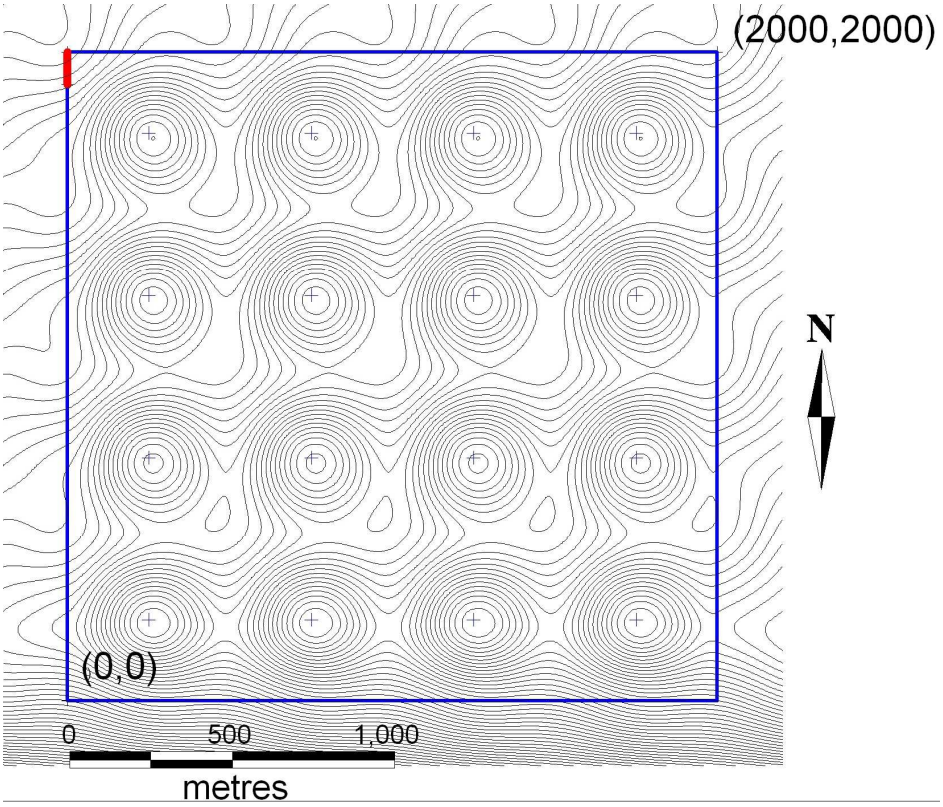

Figure (a): Map of the DEM showing the location of the upstream boundary condition (red line), ground elevation contour lines every 0.05 m, and output point locations (crosses).

The inflow boundary condition is applied along a 100m line running south from the North Western corner of the modelled domain, see Figure (a).
- in **Test 2A**, a flood hydrograph with a peak flow of 20m^3/s and time base of ~85mins is used. The model is run for 2 days (48 hours) to allow the inundation to settle to its final state.
- in **Test 2B**, a flood hydrograph with a peak flow of 1.2m^3/s and time base of ~1340 mins is used. The model is run for 4 days (92 hours) to allow the inundation to settle to its final state.

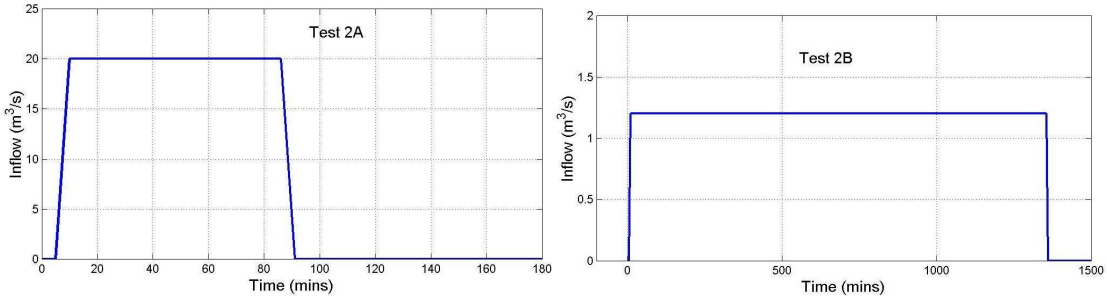

Figure (b): Inflow hydrographs used as upstream boundary condition in Test 2A (left) and Test 2B (right).

3. Boundary and initial conditions

Inflow along the red line in Figure (a). Location and tables provided as part of dataset.

All other boundaries are closed.

Initial condition: Dry bed.

4. Parameter values

Manning's n: 0.03 (uniform)

Model grid resolution: 20m
(or ~10000 nodes in the area modelled)

Time of end: model is to be run until time t = 48 hours in Test 2A
t = 96 hours in Test 2B

5. Required output

Software package used: version and numerical scheme.

Specification of hardware used to undertake the simulation: processor type and speed, RAM.

Minimum recommended hardware specification for a simulation of this type.

Time increment used, grid resolution (or number of nodes in area modelled) and total simulation time to specified time of end.
Total water volume on the floodplain at the end of the simulation.

Numerical prediction of **water level** and (scalar) **velocity** versus time at the centre of each depression (coordinates provided as part of dataset).
Output frequency: 300s.

6. Dataset content

Description	File Name
Georeferenced Raster ASCII DEM at resolution 2m	Test2DEM.asc
Upstream boundary condition table (inflow vs. time) for Test 2A and Test 2B	Test2A_BC.csv and Test2B_BC.csv
Outline of modelled area (shapefiles)	Test2ActiveArea_region
Location of upstream boundary condition (shapefile)	Test2BC_polyline
Location of output points	Test2Output.csv

7. Additional comments

Linear interpolation should be used to interpolate inflow values.

Participants are asked to provide model results **at least** for the grid resolution specified above.

Model results for 1 alternative resolution or mesh may also be provided.

Participants are asked to justify their reasons for not carrying out the test, or for carrying out the test using an alternative resolution.