CRAF 2 – Sprint Session
(Wednesday)
Physical Modeling - Steps
Three different flavors

There are three different flavors CSOs can choose from to apply during the sprint session:

1. **Do everything from scratch yourself.**
   a. Requires building the profiles with GIS tools or any other method
   b. Requires a lot of coding (and time)
   c. Only option for CSOs without Windows and without Matlab

2. **Use the scripts made by Marc and Enrico (see email from Marc on 08 and 09 of June)**
   a. Requires building the profiles with GIS tools or any other method that you prefer
   b. Some Matlab coding might be needed to apply it at your case study
   c. Good for CSOs with experience in GIS and with Matlab

3. **Use Delft Dashboard**
   a. Creating transects and nesting is done through a GUI
   b. Some coding is needed (can be in Matlab, Python or whatever you prefer)
   c. Good for CSOs without experience in GIS and/or without Matlab
## Steps by step: CRAF2 hazards

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Goal: perform all the steps at least once during the sprint session

1. INDRA needs:
   1. maximum inundation [m]
   2. maximum depth-velocity [m²/s]

2. Therefore we model with LISFLOOD

3. Input for LISFLOOD are discharge time series

4. Discharges are determined with XBeach

5. Based on water levels and waves offshore
CRAF2- General model-script train

Profiles

Xbeach BC and setup files

Matlab script that calls: profile2Xbeach_func profile edition

main

RUN XBEACH

Lisflood template files

DTM

Matlab script that calls: Berm_location

Output_assessment

RUN LISRFOOD

Risc-Kit Delft, June 2016
XBeach settings

Params.txt settings
CFL = 0.7
morfac = 5
break = roelvink_daly
tintm = 1800
bedfriction = manning

Grid settings
dxmin = 2 meter
dxmax = 50 meter
start depth = 2.5x maximum Hs
## LISFLOOD settings

### Parameter settings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Unit</th>
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<tr>
<td>initial_tstep</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>fpfric</td>
<td>0.06</td>
<td>[Manning]</td>
</tr>
<tr>
<td>infiltration</td>
<td>0.00001</td>
<td>[m/s]</td>
</tr>
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- > more next slide

### General keywords

- comp_out
- hazard
- elevoff
CRAF2 – Infiltration guidelines

INfiltration Value in LISFLOOD Simulations

- Results in LISFLOOD simulations are quite sensitive to the infiltration parameter, depending on the characteristics of the storms and the topography of the site.

- The best approach would be that each CSO looks in the literature if there exists any study about infiltration in their site, or in similar sites in the area in terms of land use and geomorphology.

- In any case, general values of infiltration depending on the soil texture can be used:

<table>
<thead>
<tr>
<th>Soil Characteristics</th>
<th>Slope 0-5%</th>
<th>Slope 5-8%</th>
<th>Slope 8-12%</th>
<th>Slope &gt;15%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With Vegetation</td>
<td>Without Vegetation</td>
<td>With Vegetation</td>
<td>Without Vegetation</td>
</tr>
<tr>
<td>Uniform coarse sand</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>38</td>
</tr>
<tr>
<td>Coarse sand over compacted soil</td>
<td>44</td>
<td>38</td>
<td>31</td>
<td>25</td>
</tr>
<tr>
<td>Uniform sandy loam</td>
<td>44</td>
<td>25</td>
<td>32</td>
<td>20</td>
</tr>
<tr>
<td>Sandy loam over compacted soil</td>
<td>32</td>
<td>19</td>
<td>25</td>
<td>13</td>
</tr>
<tr>
<td>Uniform silty loam</td>
<td>25</td>
<td>13</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Silty loam over compacted soil</td>
<td>15</td>
<td>7.5</td>
<td>13</td>
<td>6.4</td>
</tr>
<tr>
<td>Clay or Clay loam soil</td>
<td>5</td>
<td>3.8</td>
<td>3.8</td>
<td>2.5</td>
</tr>
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</table>

Risc-Kit Delft, June 2016
Step 1 and 2) Do I have all data correctly prepared?
   All storms (timeseries) in separate files in “xbeach_setup/bc”
   All water level time series in separate files “xbeach_setup/bc”
   Hard layer polygon (if needed) in “xbeach_setup/hardlayer_polygon”
   Template params.txt file in “xbeach_setup/params”

Step 3) Create XBeach transects with ArcGIS or Delft Dashboard

Step 4) Nest for 1 storm XBeach transect models in LISFLOOD
   a) Create LISFLOOD setup with a DTM and params.txt

   b) Run ‘reduced’ model train for 1 storm

2 options for step 4
Option 1: use step03-04-05_mainloop.m
Option 2: use Delft Dashboard
If running with step03-04-05_main.m & step06_output_assessment

STEP I) Is everything correct in “main.m” script?
   Edit filenames
   Edit number of cores
   Edit the name of the xbeach executable if necessary
   Select the storm you want to model

STEP II) Run “main.m” script

STEP III) Run “xbrunMP.bat” in “XbeachMPexecute” folder

STEP IV) Is everything correct in “output_assessment.m” script?
   Edit filenames
   Edit LISFLOOD cellsize and tintm used in xbeach
   Specify the contribution distances of your profiles (proper order)

STEP V) Run “output_assessment.m” script

STEP VI) Run LISFLOOD
If running with Delft Dashboard

STEP I) Define settings
   # cores, timestep for nesting, nesting type, location Xbeach & LISFLOOD

STEP II) Make observation points

STEP III) Run batch script
Goal of step 4: working model train in which multiple Xbeach transects successfully give information to LISFLOOD.

Check the following:
• Hydrodynamics of XBeach
• Calculated erosion of XBeach
• The discharge locations are properly implemented
• Water is flowing in LISFLOOD domain

Step 5) Create 1 batch file for XBeach transect models for 40 storms. And run it
We provide the possibility to calculate on the computational facilities of Deltasres

2 options for step 5
Option 1: use step03-04-05_main.m
Option 2: use step05_mainloop.m
If running with step03-04-05_main.m

STEP I) Is everything correct in “main.m” script?
   - Edit filenames
   - Edit number of cores
   - Edit the name of the xbeach executable if necessary

STEP II) Run “main.m” script

STEP III) Run “xbrunMP.bat” in “XbeachMPexecute” folder
If running with step05_mainloop.m

STEP I) Is everything correct in “step04_mainloop.m” script?
   Edit filenames
   Edit number of cores
   Edit the name of the xbeach executable if necessary
   Edit storm conditions

STEP II) Run “step05_mainloop.m” script
Goals today

1. XBeach & LISFLOOD model setup
2. Successful nesting for 1 storm
3. Created batch file for 40 storms in Xbeach.
   This file should be finished overnight
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Day 2 – LISFLOOD modeling

Step 6) Volume assessment
Do extreme volume analysis on the discharges calculated with XBeach
Determine discharges for a ‘return period’
Determine erosion polygon
Number of years and TR
Specify the contribution distances of your profiles (proper order)
Edit filenames en edit LISFLOOD cellsize and tintm used in xbeach
Day 2 — LISFLOOD modeling

Step 7) Run LISFLOOD for certain return period
   - Check your values in the DEM, decimal operator must be “.”
   - Template “boundaries.txt” file in “lisflood_setup” folder
   - Template “parameter_filename.txt” file in “lisflood_setup” folder
   - Check that the keyword “hazard” is in your parameters file
   - Specify a value for the infiltration parameter (m/s)

Step 8) Visualize LISFLOOD inundation results

Step 9) Determine depth-velocity product for INDRA
   - Obtain the maximum depth*velocity combination
     Use maxVc and maxVcd and combine them in ArcGis
Goals today

1. Output assessment of discharges
2. Run LISFLOOD for a return period based on output assessment
3. Created figures and maps of inundation and depth-velocity products for INDRA
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