

TerraSTREAM: Flood Simulation

Motivation

- Floods caused by rising oceans is an increasing issue.
- The EUs water framework directive has caused an increasing interest in flood risk management ...
 - ... and several big flooding incidents worldwide makes flood risk management crucial.
- TerraSTREAM can compute what part of a grid or TIN DEM will be flooded.
- This works for arbitrarily large terrains.
- It is important to take dikes and other natural features into account



Flooding in TerraSTREAM

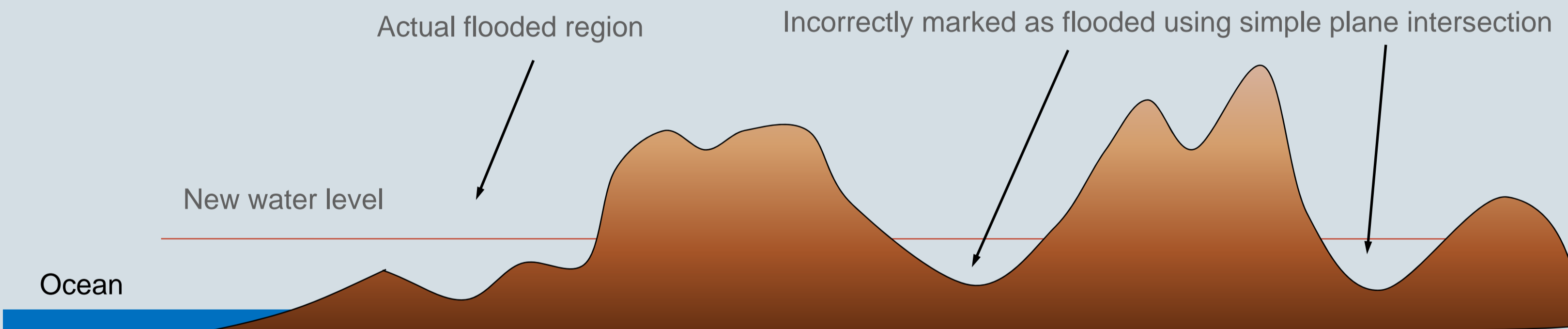
- TerraSTREAM can compute flood risk maps for arbitrarily sized DEMs regardless of the memory size of the computer.
- Dikes and natural obstructions in the terrain are taken into to consideration.
- The algorithms used are provable efficient regardless of the characteristics and size of the input terrain.
- The user can specify masks where flooding occurs if particular flooding sources are known.

Denmark under Water



- The blue parts of the map to the right denotes land that would flood if the ocean around Denmark rose 3.5 meters. (Data provided by COWI)

Flooding Masks



- Given a water level, TerraSTREAM can compute what parts of the terrain would flood if the ocean was to raise to that level.
- The standard way to perform this computation on bigger terrains is to intersect the terrain...
- ... this does *not* work in general as shown in the figure on the left.

Computing a General Flooding Map

- TerraSTREAM can compute a new DEM where the elevation of each point in the terrain is the height which the water needs to rise to in order for that particular point to flood in the real terrain.
- Using this new DEM one can use a simple plane intersection algorithm to get flooding masks for specific water heights

