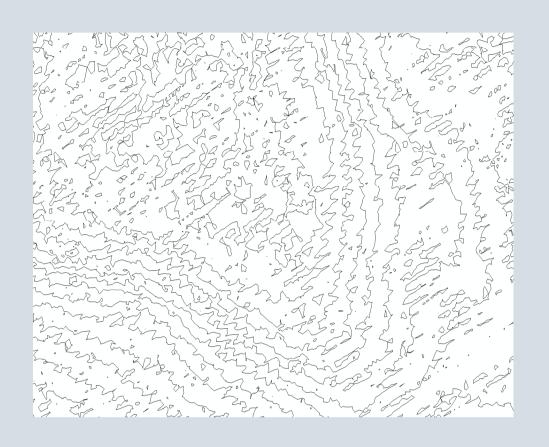
madalgo ----**CENTER FOR MASSIVE DATA ALGORITHMICS**

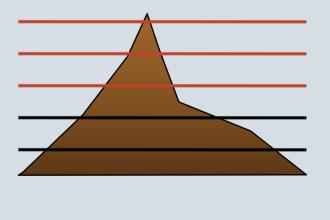
TerraSTREAM: Contour Line Generation

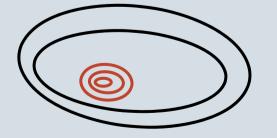
Motivation

 High resolution elevation model noisy and unpleasant looking contours.



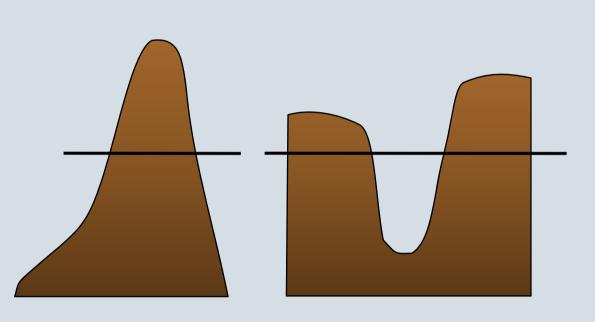
- Traditional methods typically either
 - Simplify the terrain before computing contours, or
 - Remove small (circumference) contours.
- Disadvantages
- No control over what features are removed
- Small important contours on hilltops removed





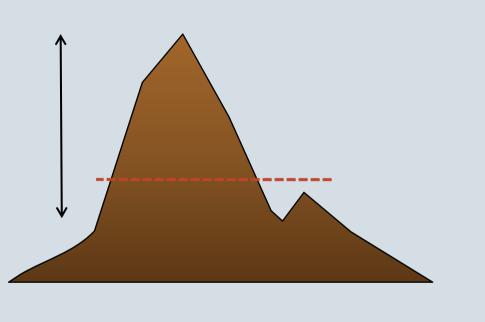
Important red contours representing hilltop often removed

• **Observation:** Small circular contours represents peaks and sinks.

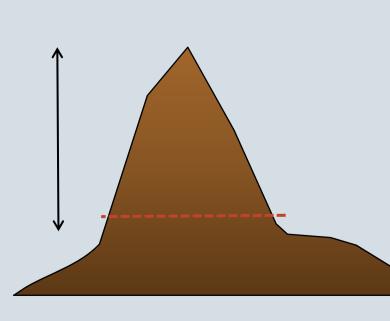


Solution

- We want to keep hilltops, but remove small bumps.
- **Observation:** Hilltops have a large vertical distance to saddle points, bumps have a low distance.



• Solution: Remove all peaks and sinks with low vertical distance to saddle point.



Flood Simulation

Topological Simplification

Grid Quality Metric

Flow Routing

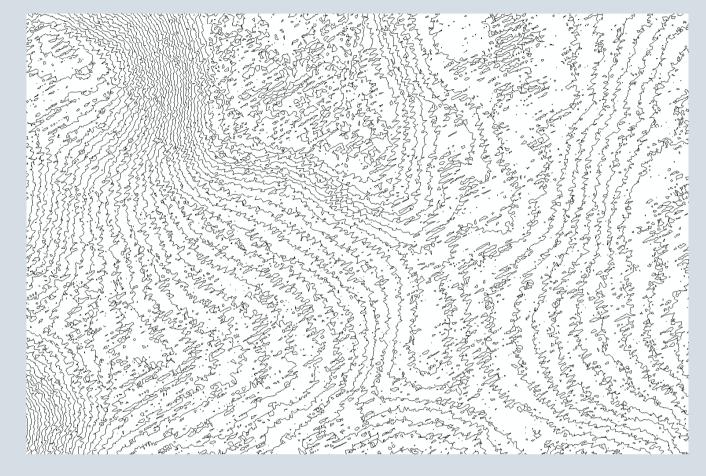
Flow Accumulation

Contour Map Generation

Results

Grid/TIN Construction

- TerraSTREAM can remove sinks and peaks based on vertical distance to saddle points (hydrological conditioning).
- Other more sophisticated criterias (such as peak/sink volume or area) can also be used.
- Method yields significant improvements:



Before hydrological conditioning

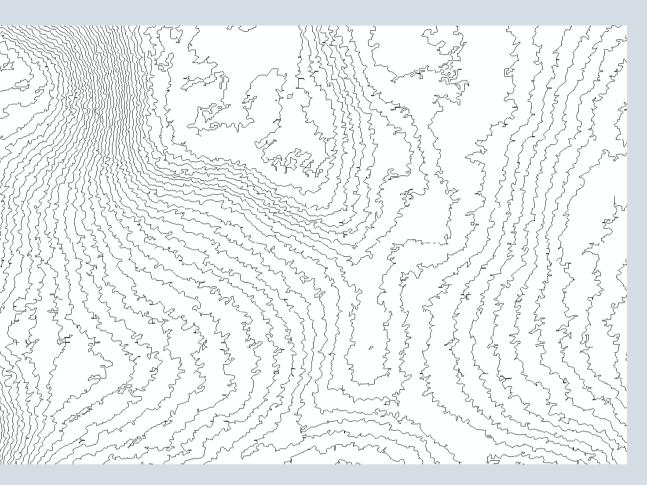


Orthophoto overlaid with 20cm contours

MADALGO – Center for Massive Data Algorithmics, a Center of the Danish National Research Foundation







After hydrological conditioning