

Geo.X Hackathon: The challenge of +4 data –
Visualizing and comparing outputs from
landscape evolution models

Network analysis of LEMs

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Problem statement

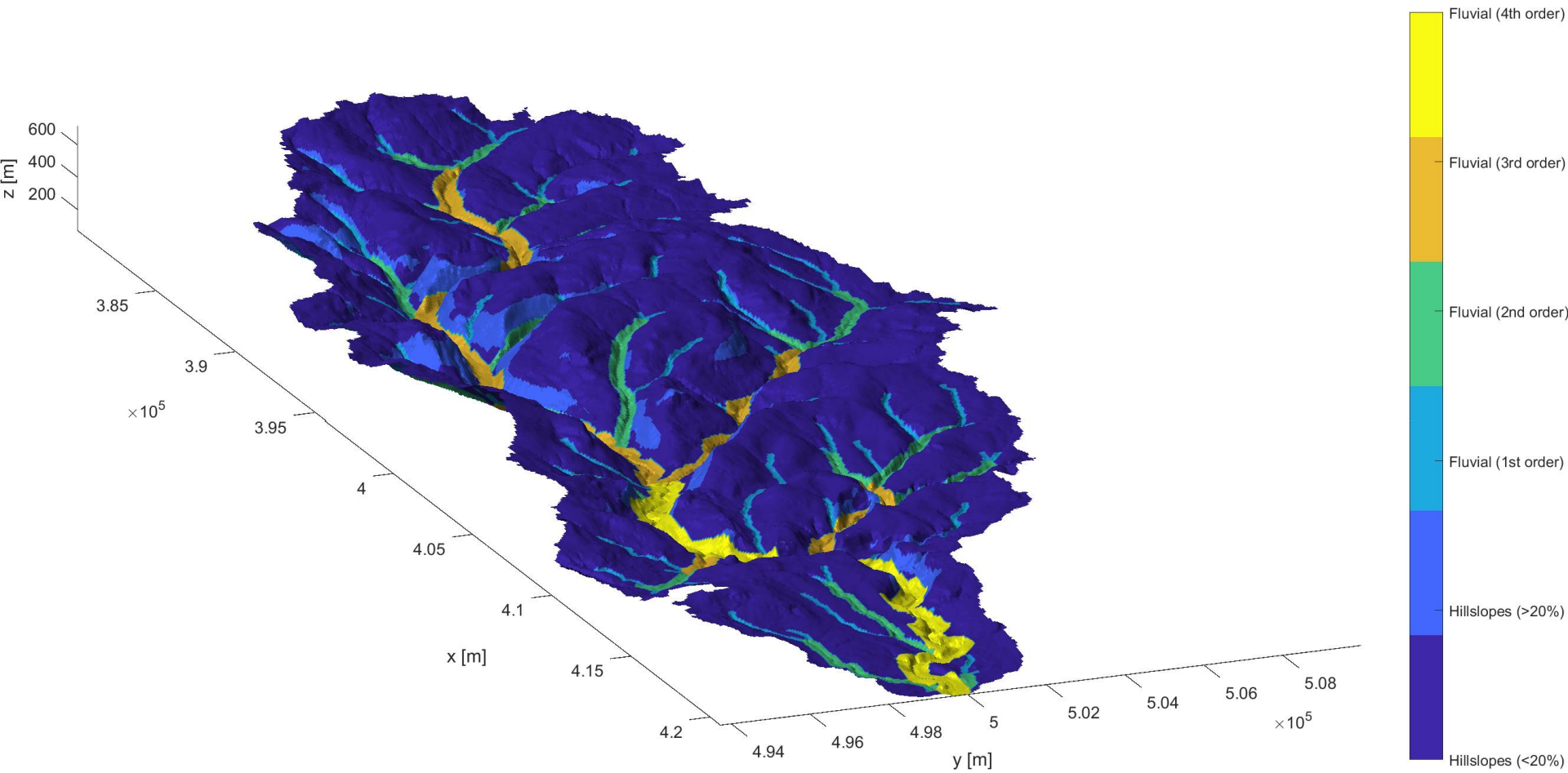
- Can 4D data be reduced to a simpler topology to
 - (a) visualize data, show data in a condensed form
 - (b) analyse the data, derive parameters
 - (c) identify or quantify processes?

Idea

- Generalisation of DEM (here: landform classification)
- Create network based on generalized DEM
- Analyse and visualize network topology instead of 4D dataset
- Network construction is based on spatial characteristics of the generalized DEM

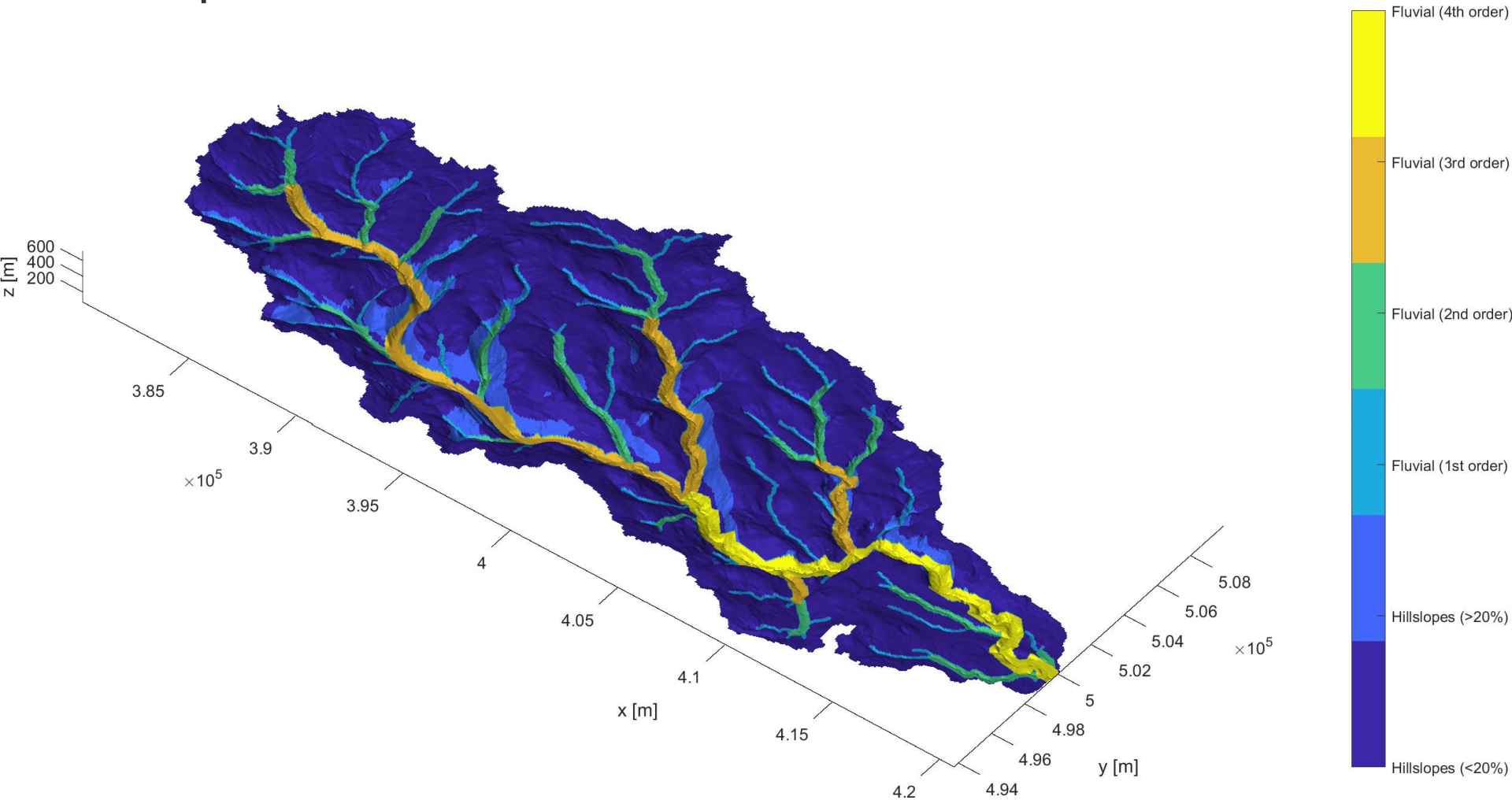
Generalisation of DEM

- Simple landform classification at $t=0$



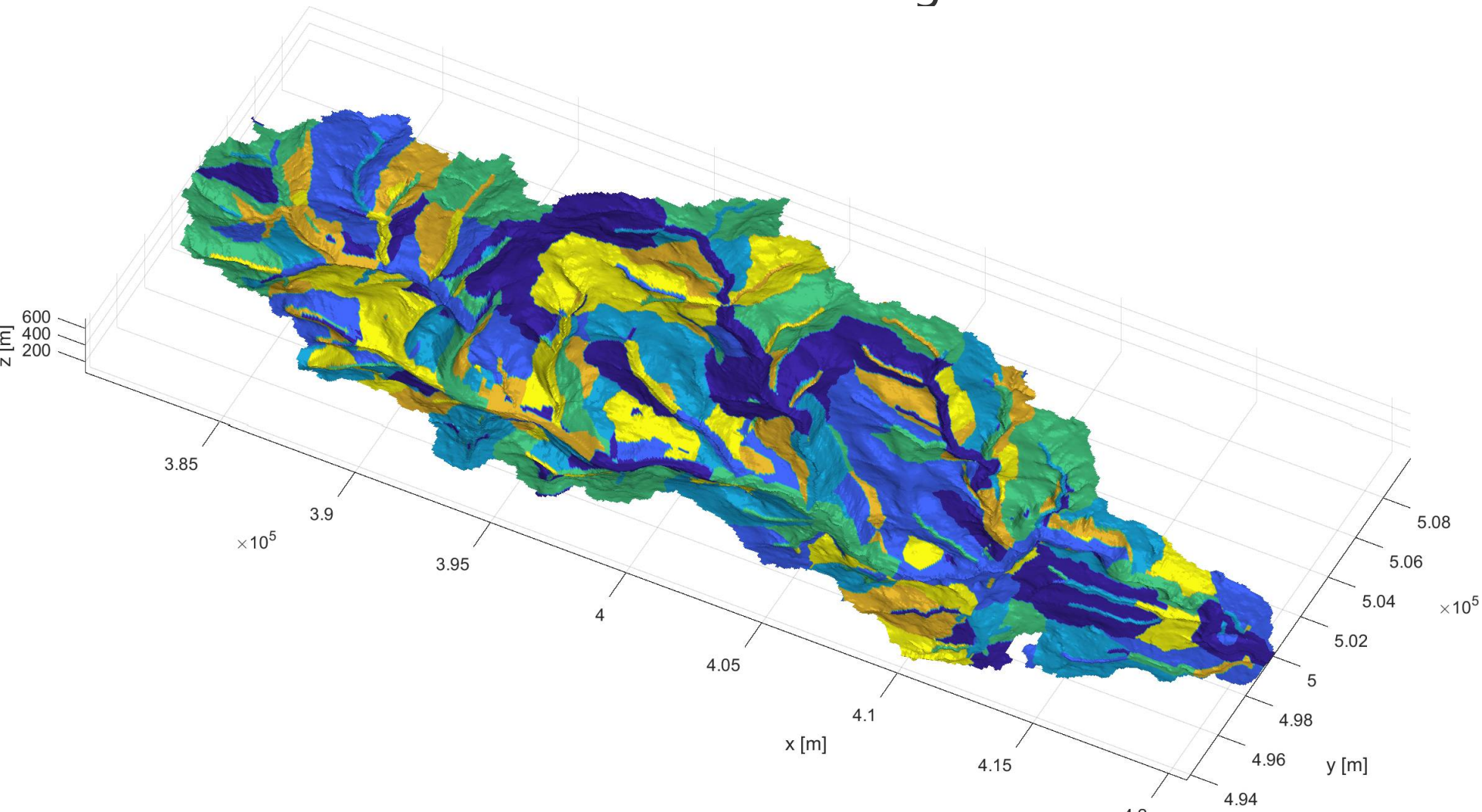
Generalisation of DEM

- Simple landform classification at $t=0$



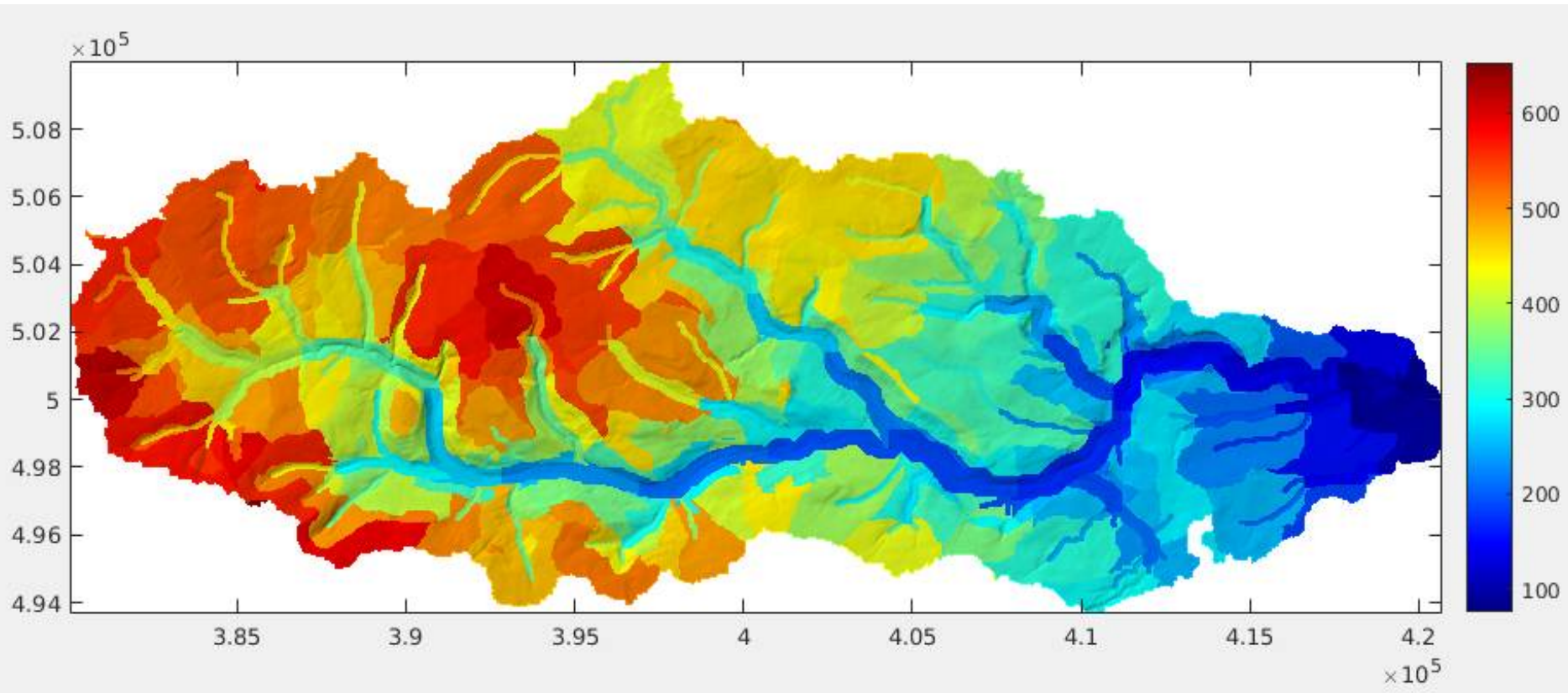
Generalisation of DEM at t=0

- Subdivide classes into smaller regions



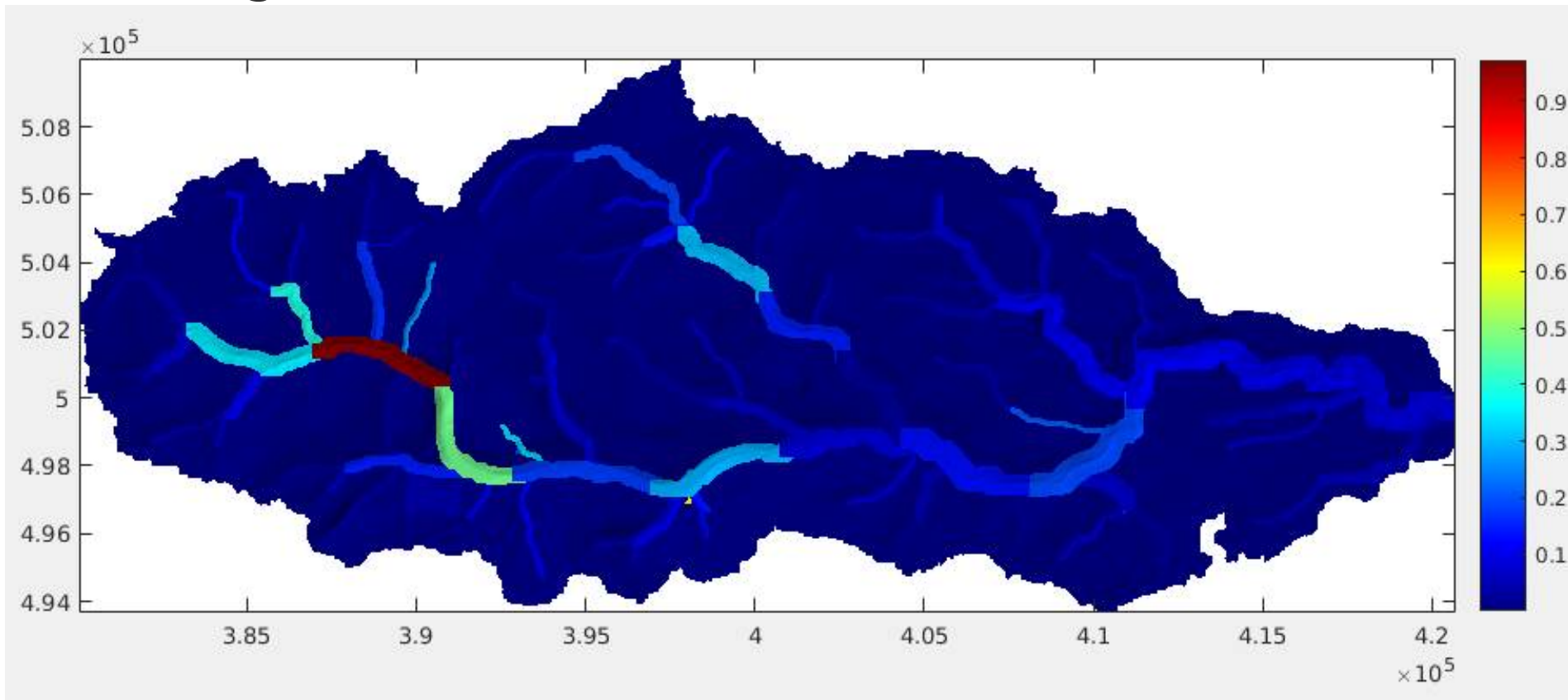
Perform zonal statistics on regions

- Example: mean elevation of each region



Aggregate zonal statistics over time

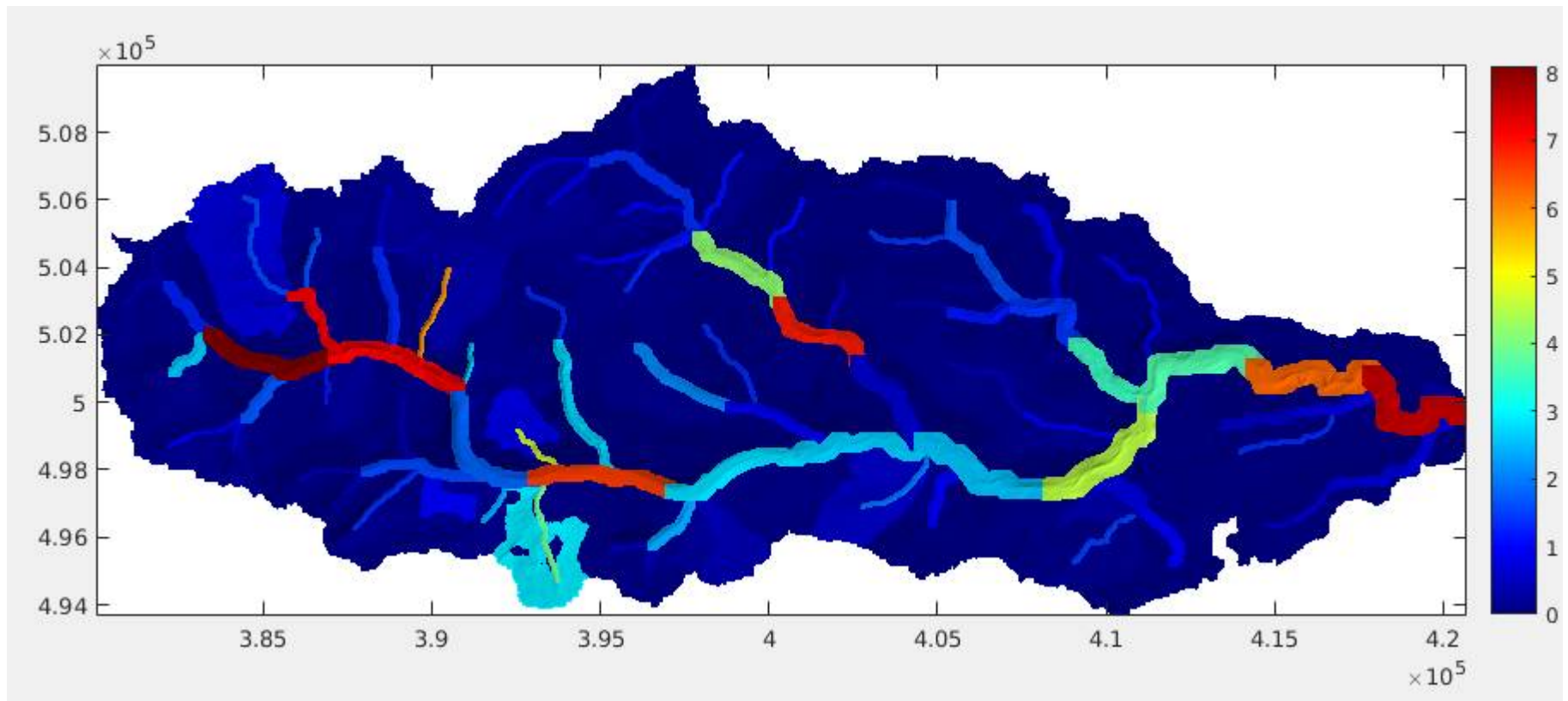
- Change of statistical value over time



- Example: change of mean elevation over time

Aggregate zonal statistics over time

- Change of statistical value over time

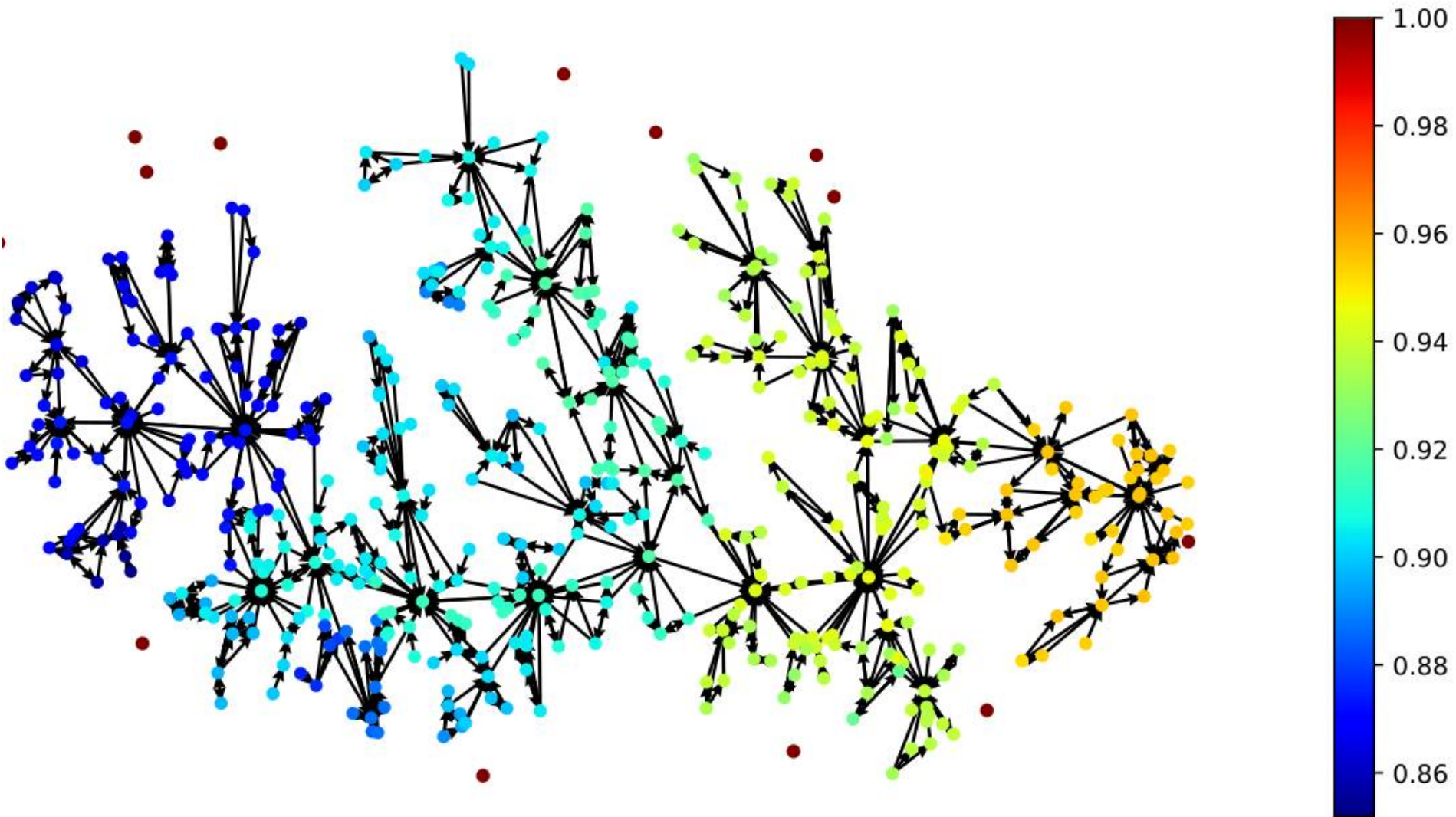


- Example: DEM of difference, time stdev of roughness

Define network nodes & edges

- Centroid of each defined region = network node
- Set node connections for neighboring regions
- Add parameters to network: e.g. zonal statistics

Directed Network topology



Node centrality versus lanscape type

