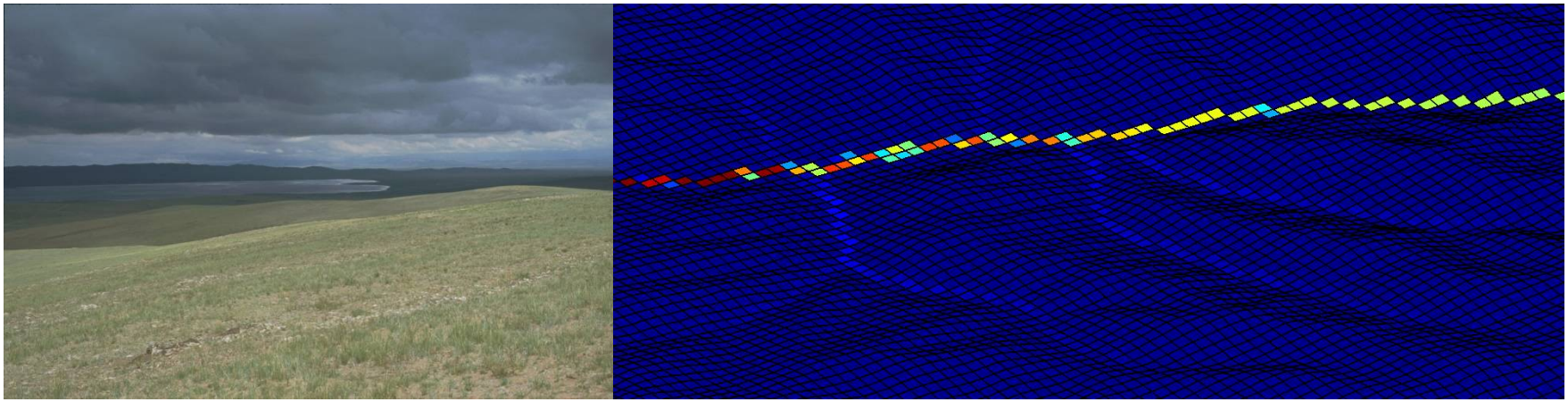


Geo.X Hackathon: The challenge of +4 data – Visualizing and comparing outputs from landscape evolution models

Network analysis of LEMs

Jan, Malte, Simon, Wolfgang

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?

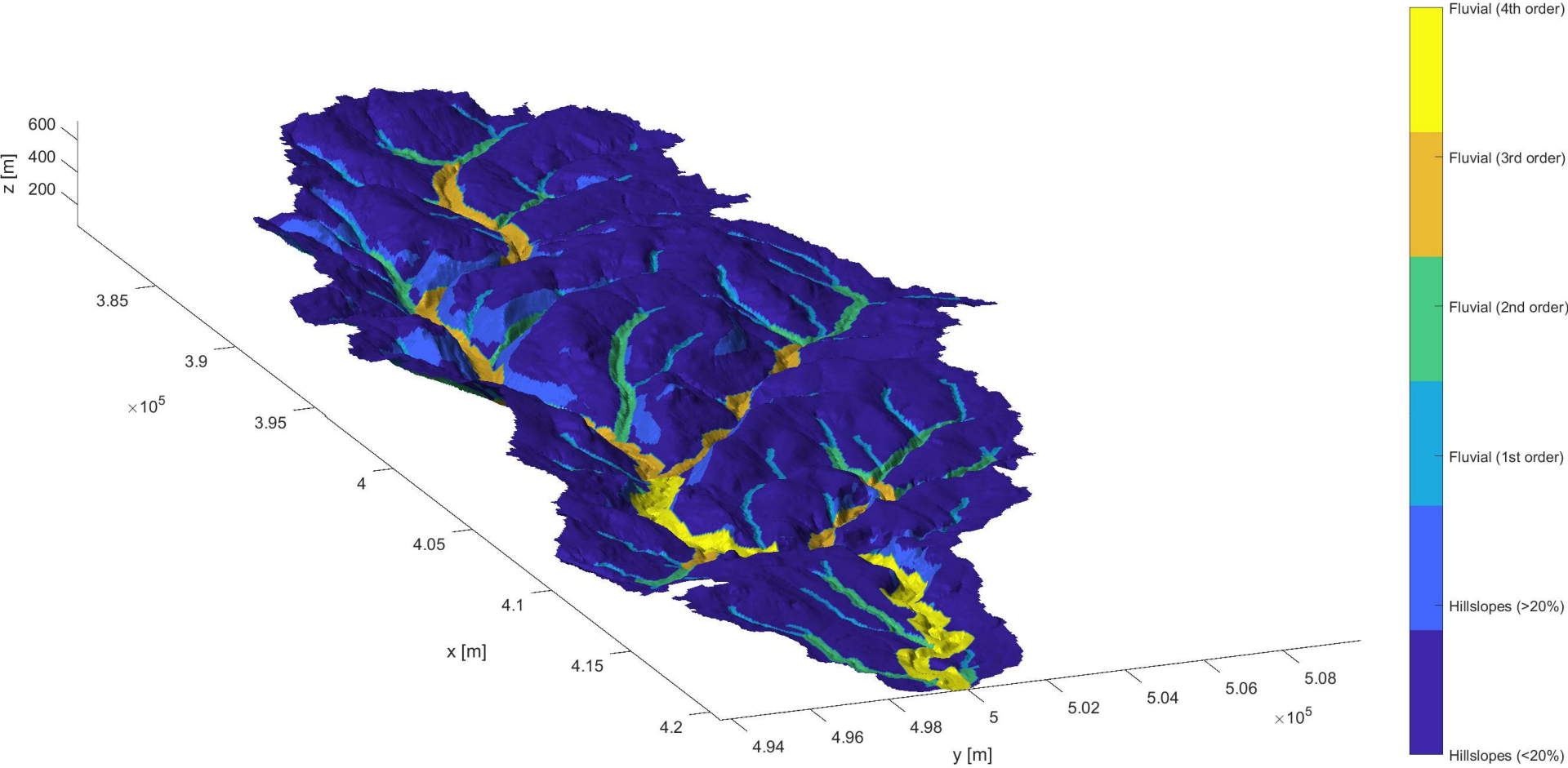
Idea

- 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

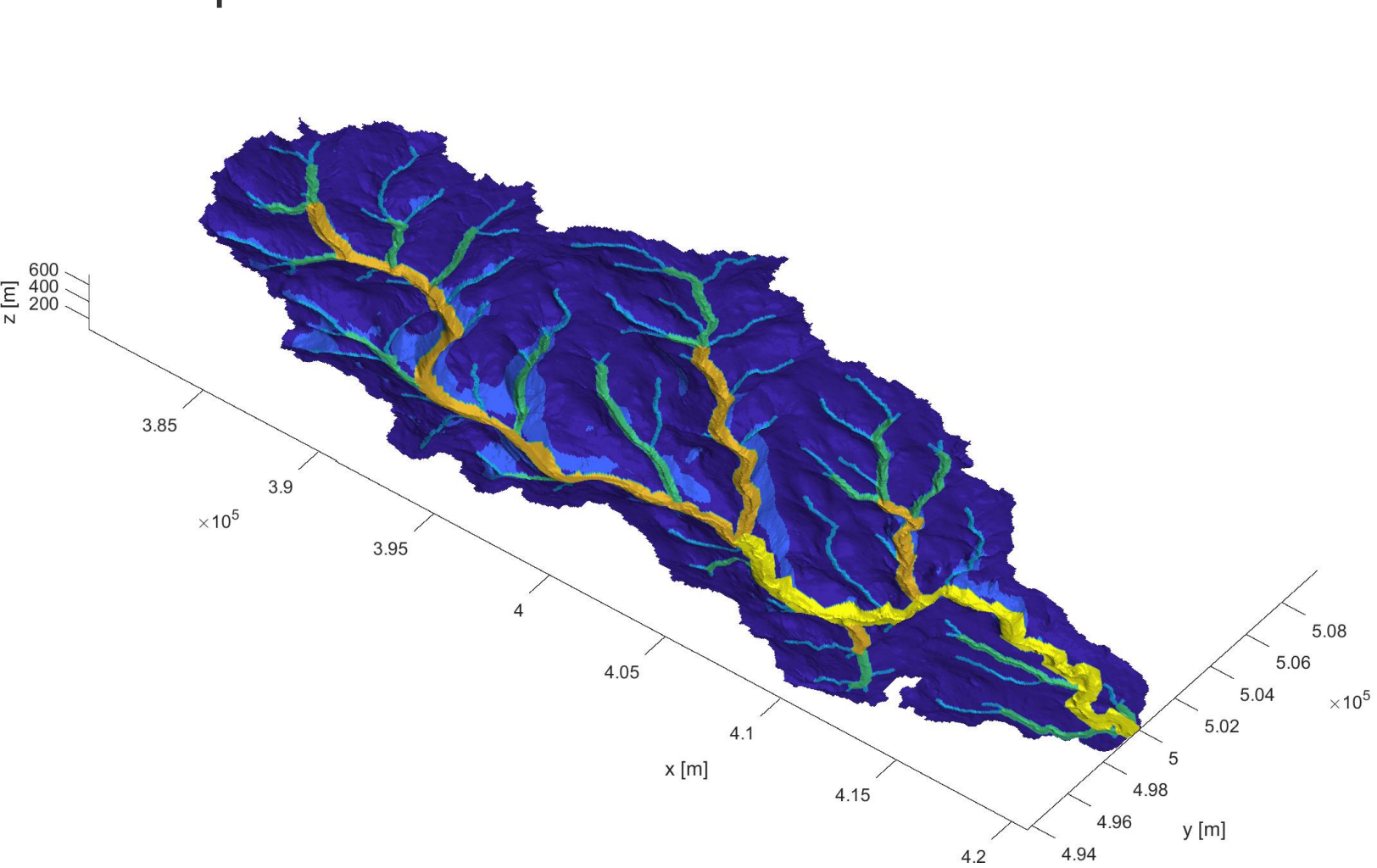
Generalisation of DEM

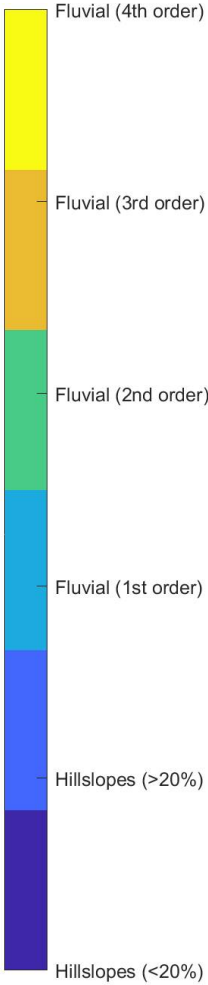
- Simple landform classification at t=0



Generalisation of DEM

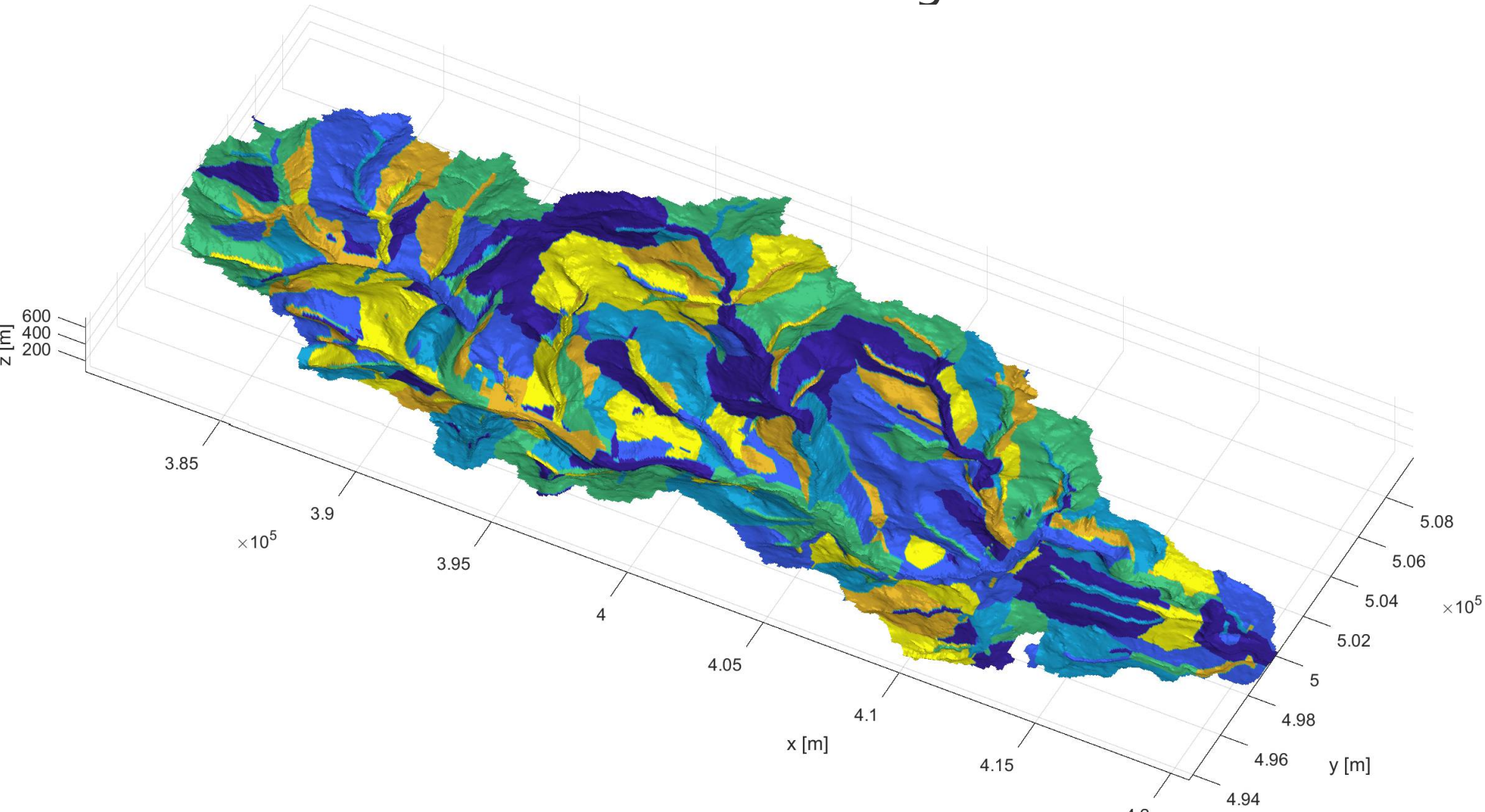
- Simple landform classification at t=0





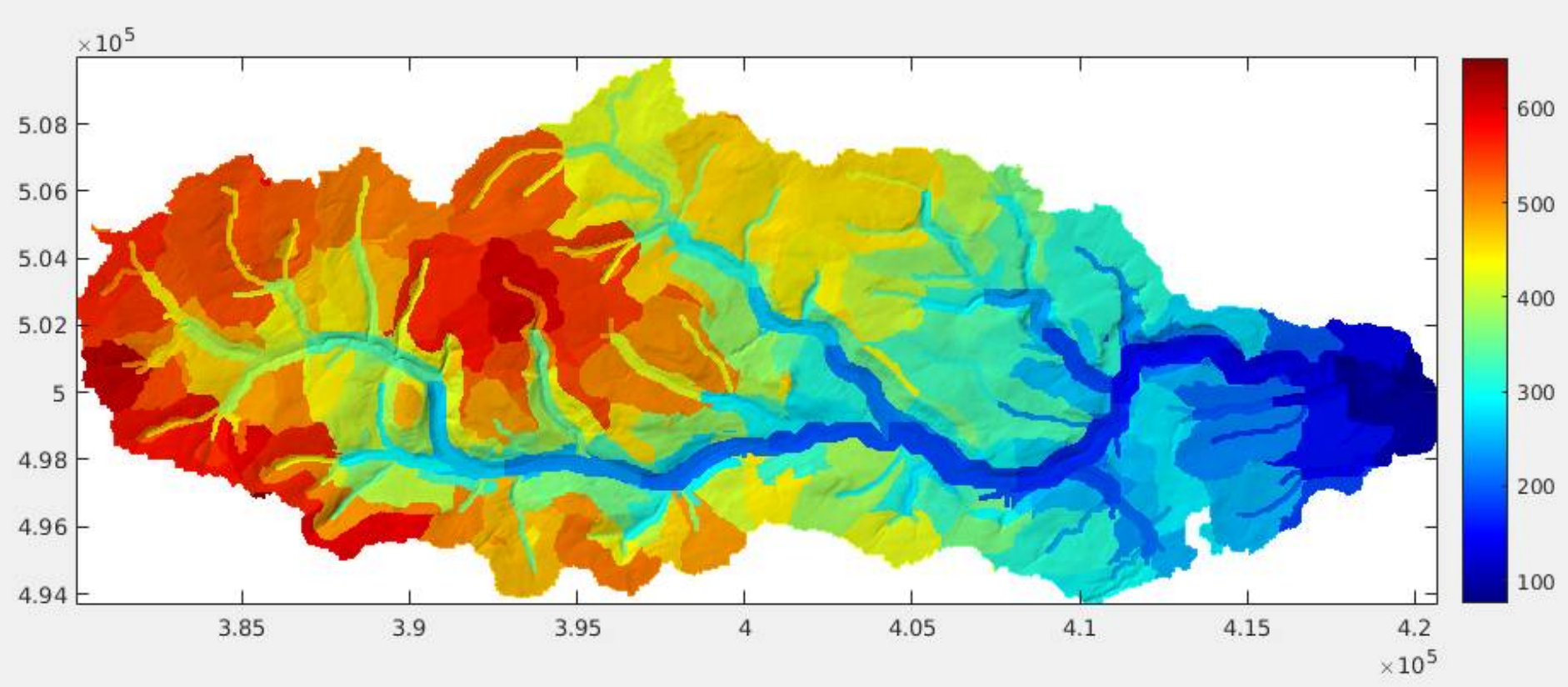
Generalisation of DEM at t=0

- Subdivide classes into smaller regions



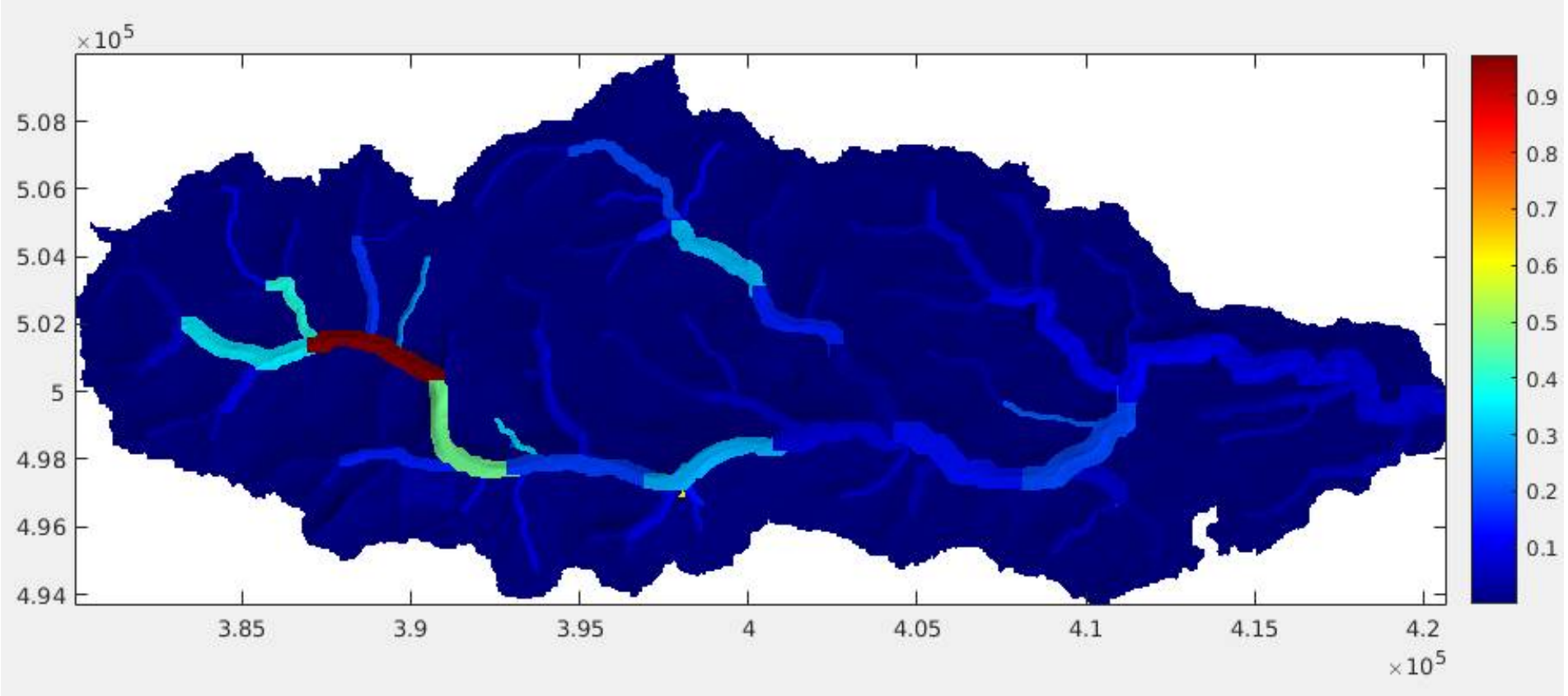
Perform zonal statistics on regions

- Example: mean elevation of each region



Aggregate zonal statistics over time

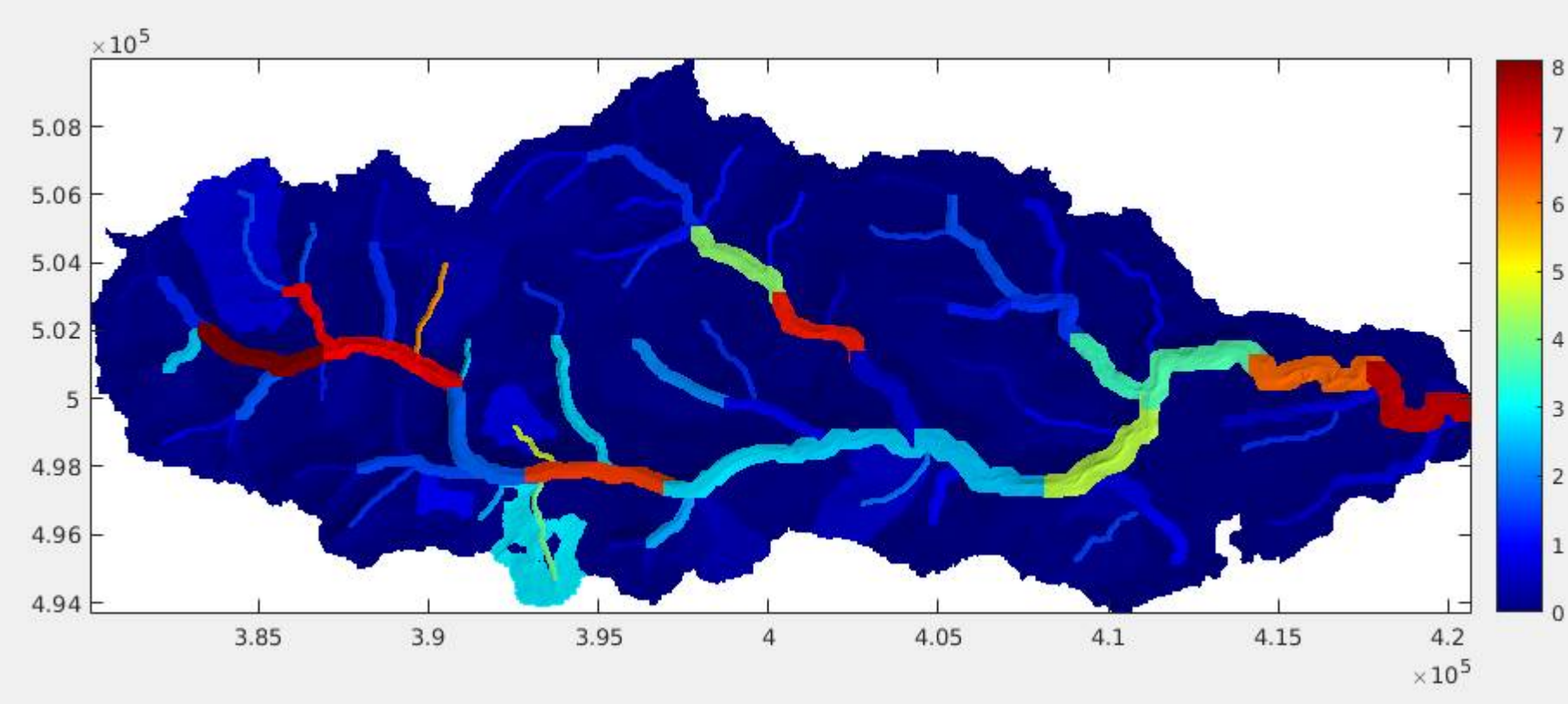
- Change of statistical value over time



- Example: change of mean elevation over time

Aggregate zonal statistics over time

- Change of statistical value over time

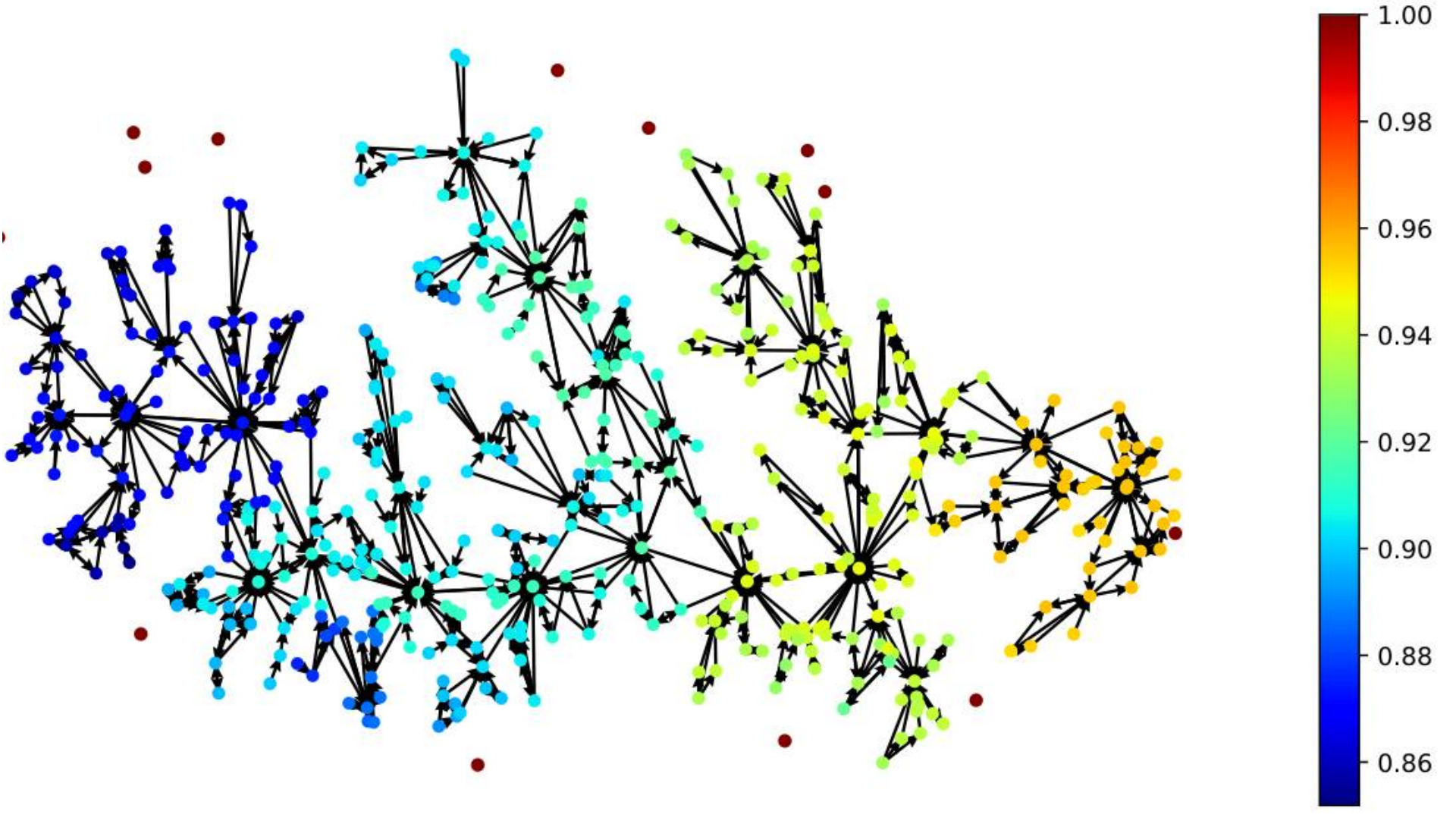


- Example: DEM of difference, time stdev of roughness

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