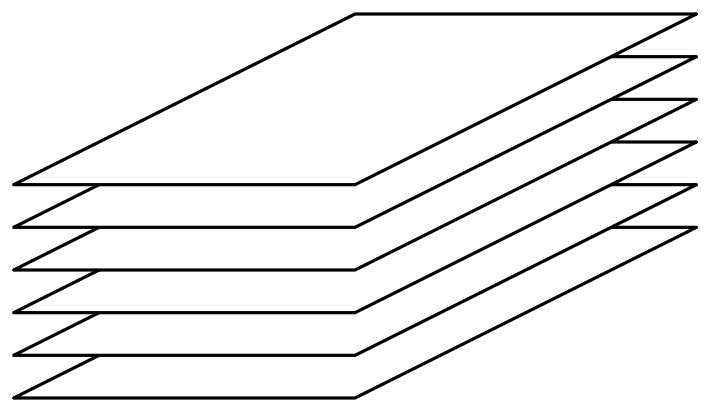
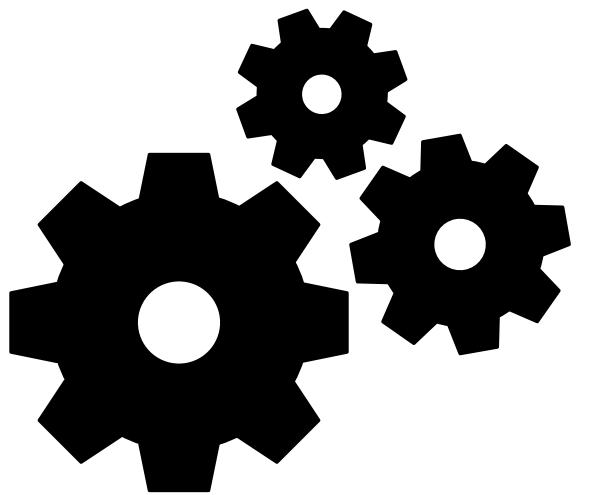
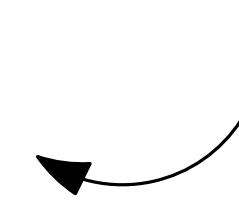
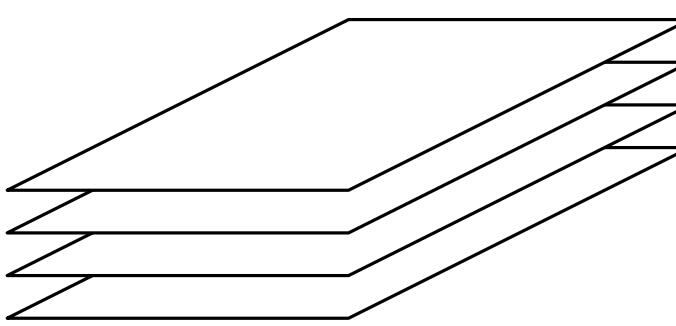
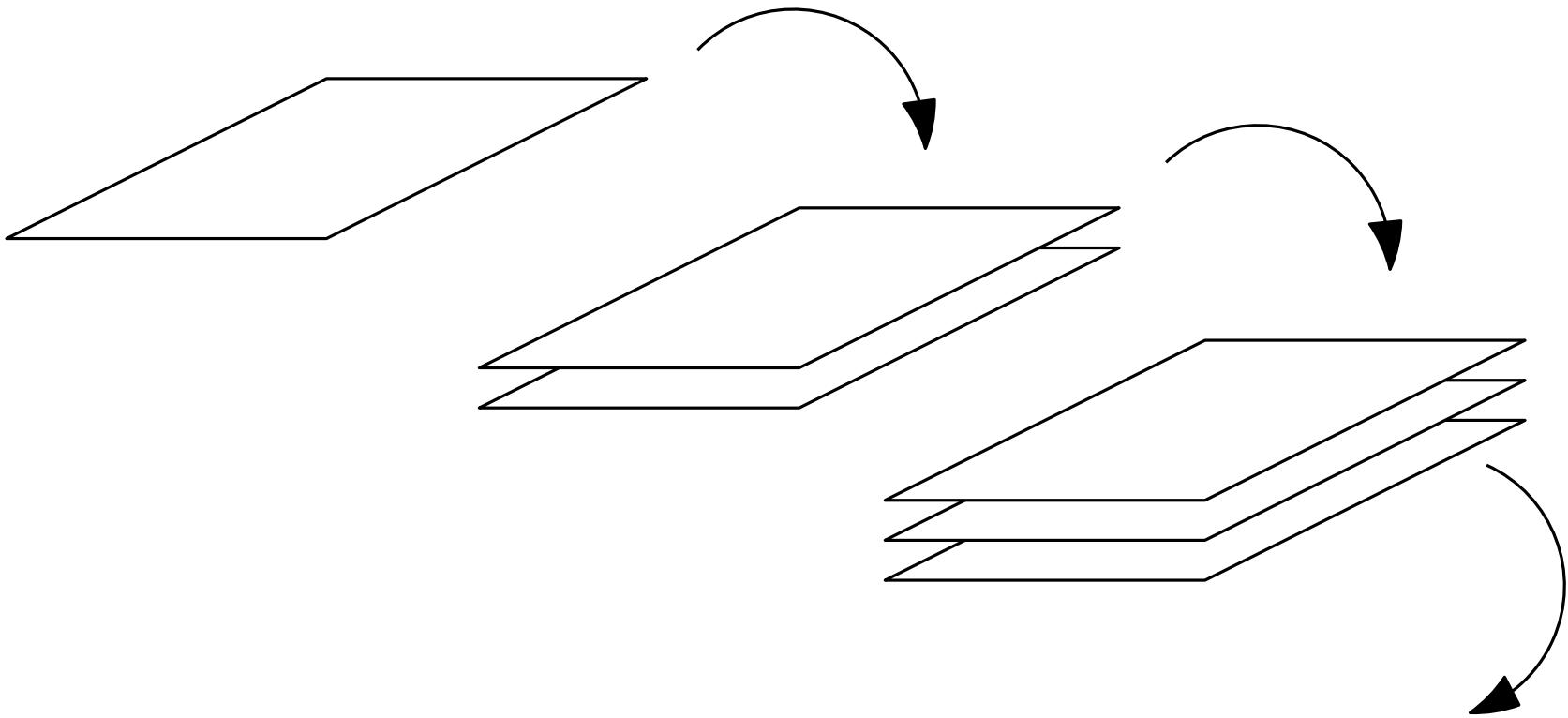
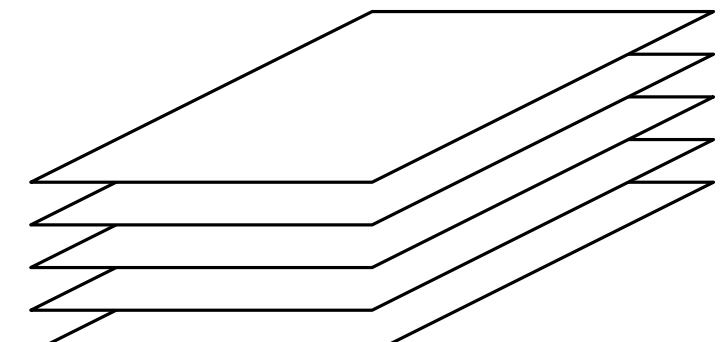
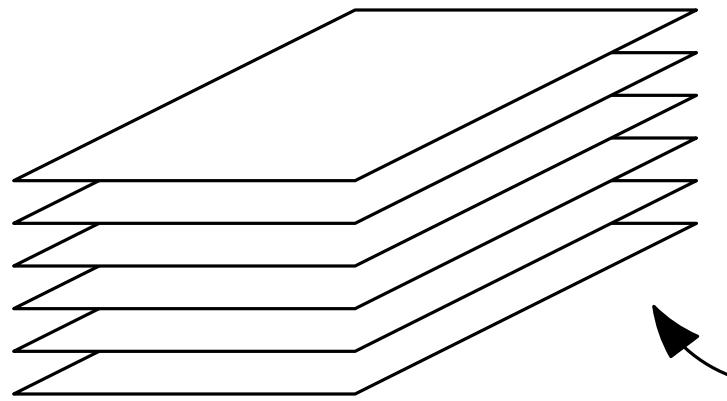
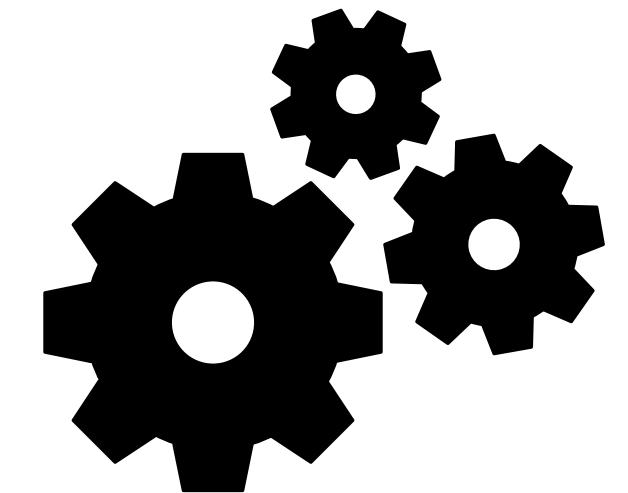
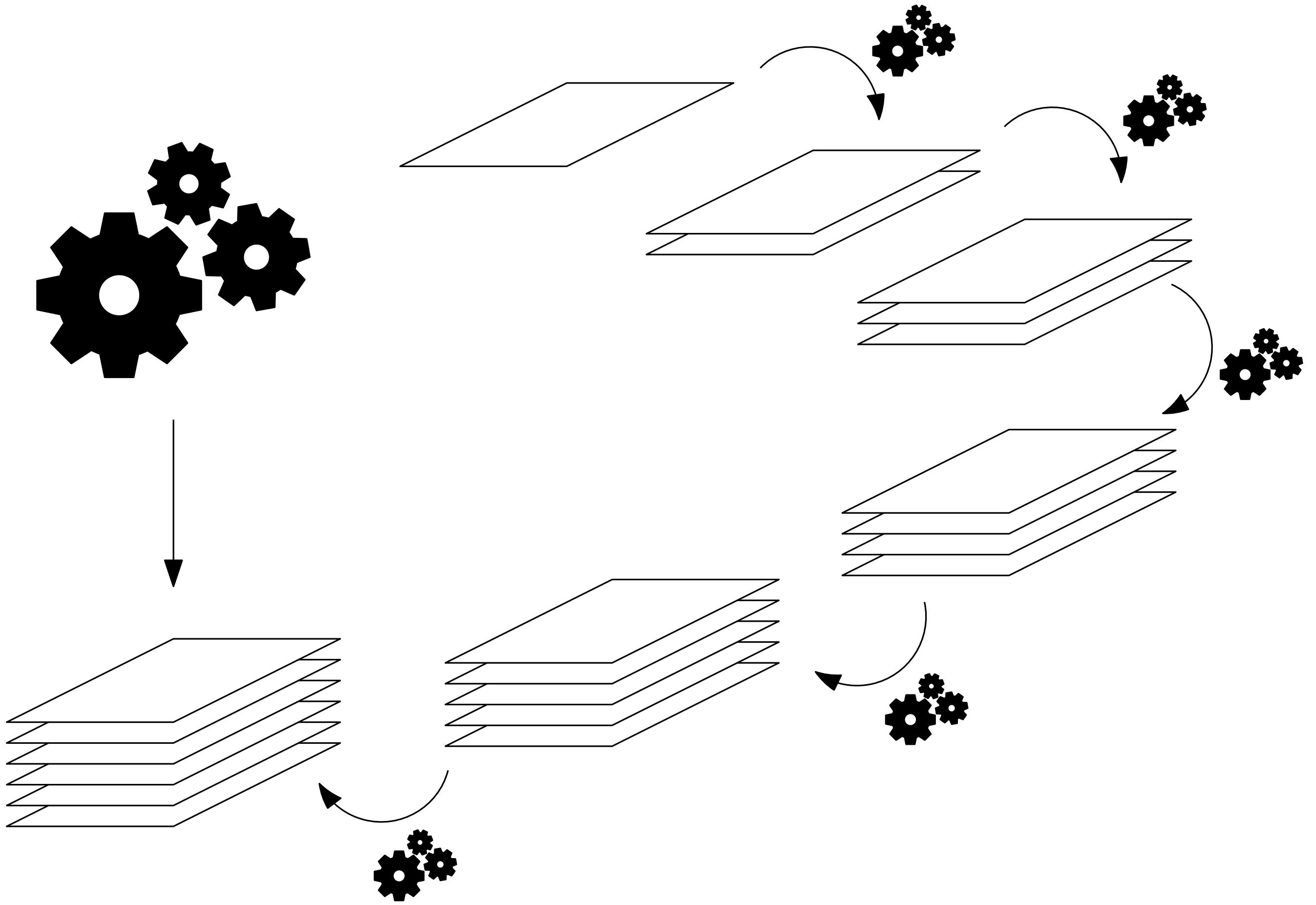
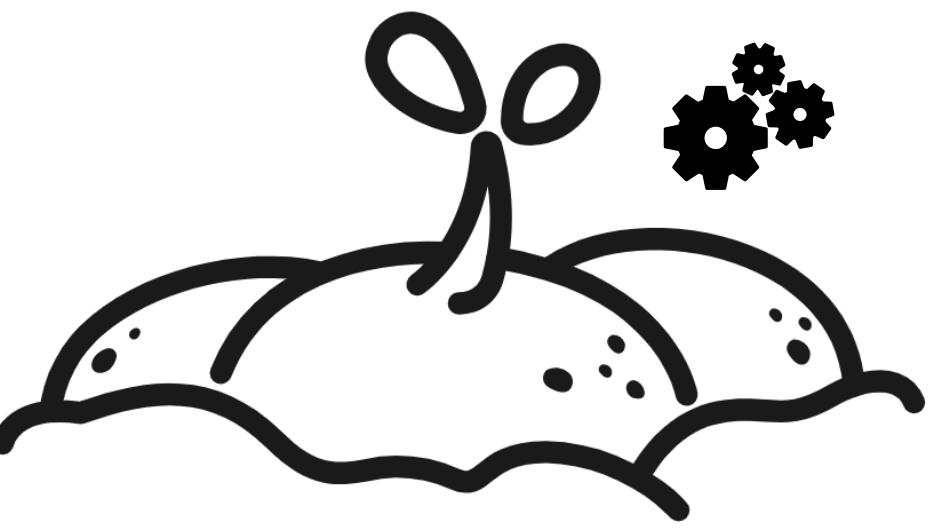


PCG through simulation









# Assignment 1

Give three examples of content that could be suitably generated by simulation.

# Terrain Generation Using Procedural Models Based on Hydrology

Jean-David Génevaux<sup>1</sup>

Éric Galin<sup>1\*</sup>

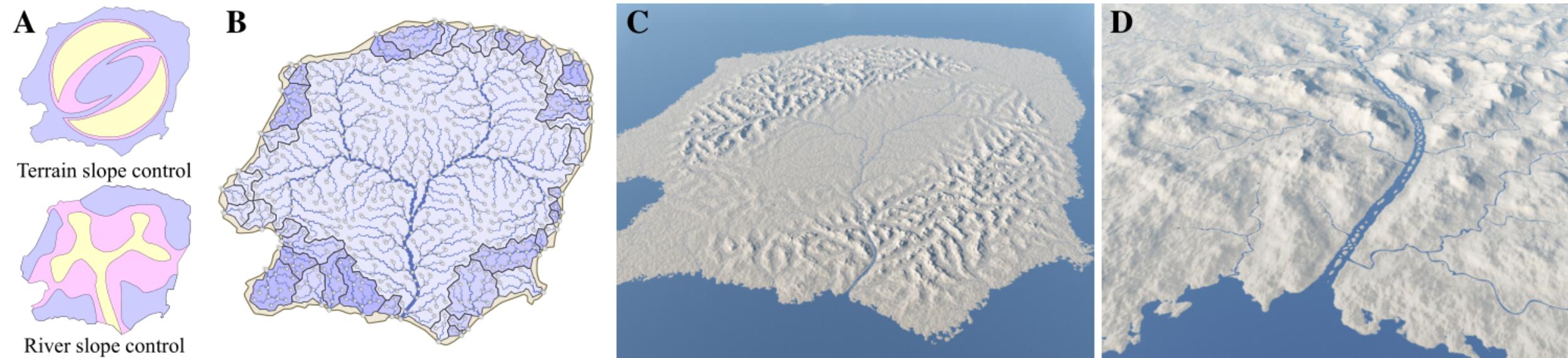
Éric Guérin<sup>1</sup>

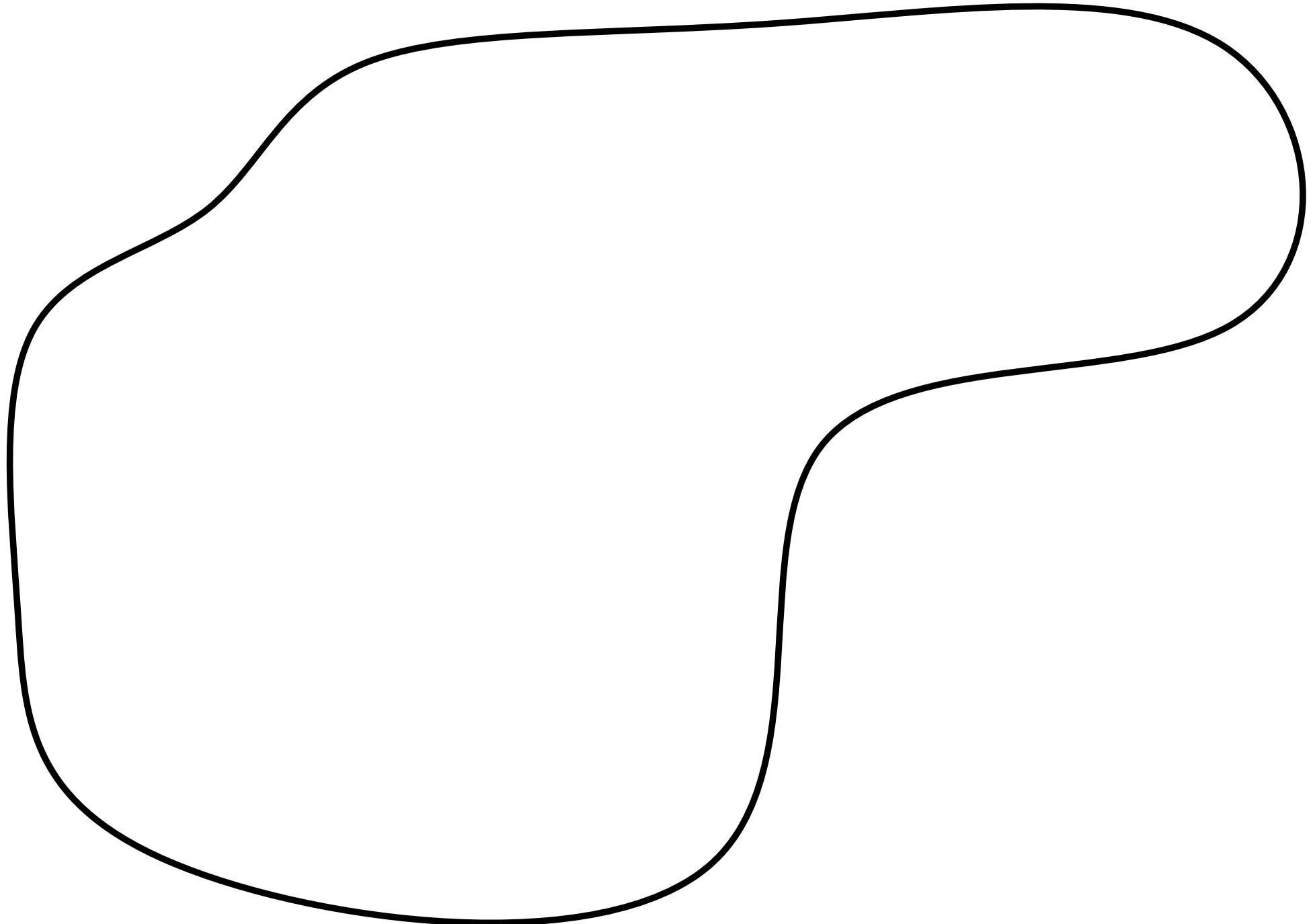
Adrien Peytavie<sup>1</sup>

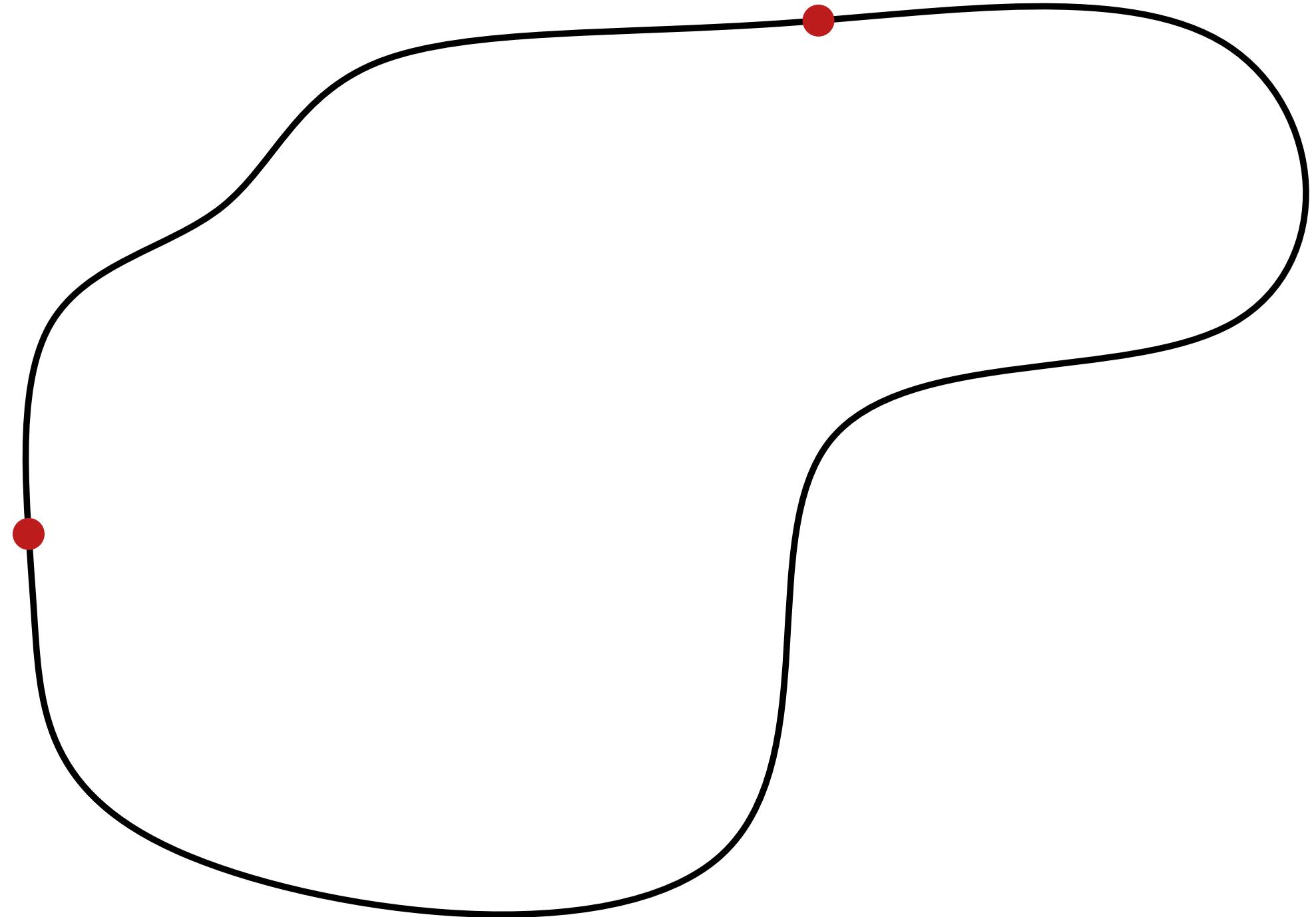
Bedřich Beneš<sup>2</sup>

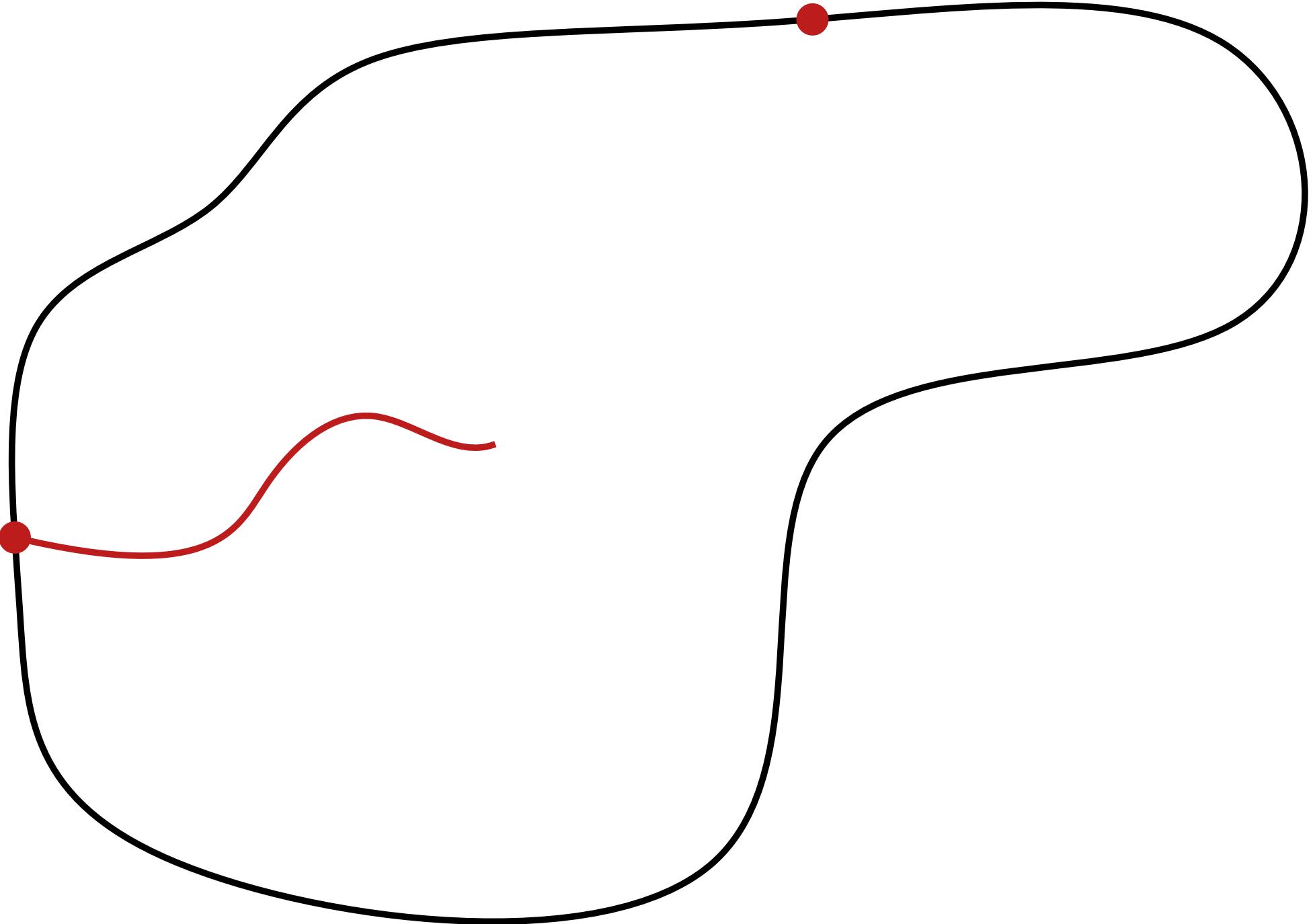
<sup>1</sup> Université de Lyon, LIRIS, CNRS, UMR5205, France

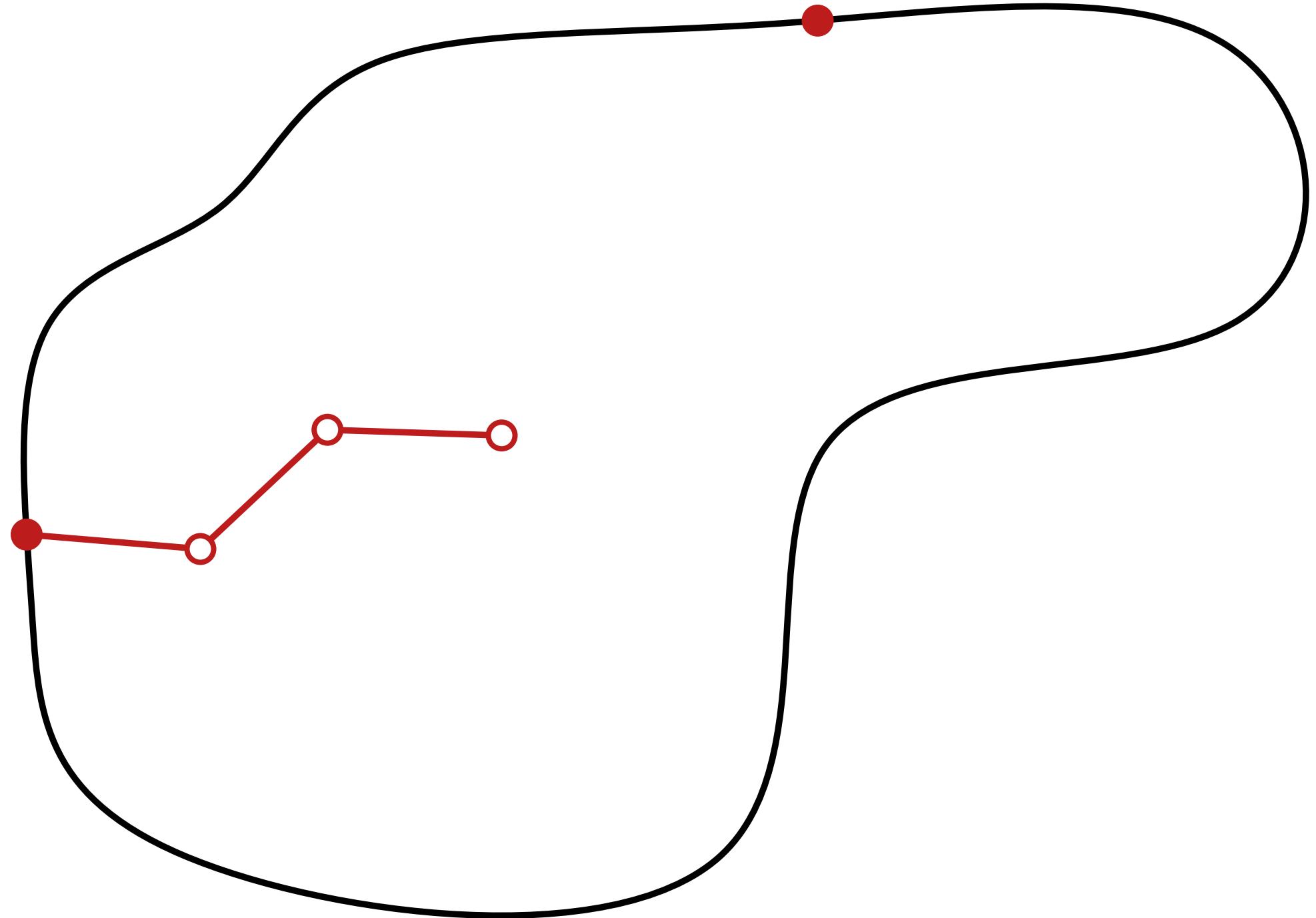
<sup>2</sup> Purdue University, USA

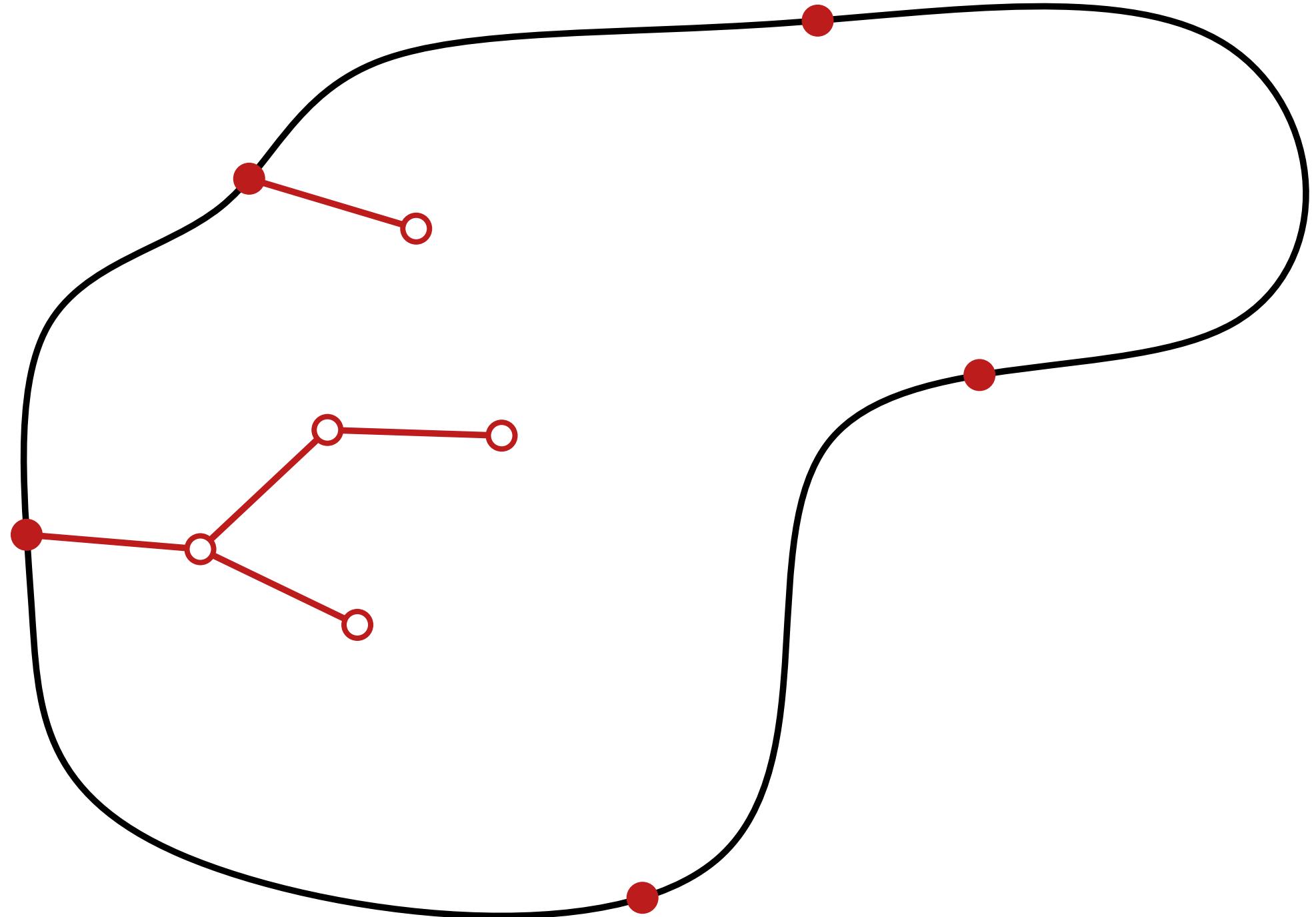


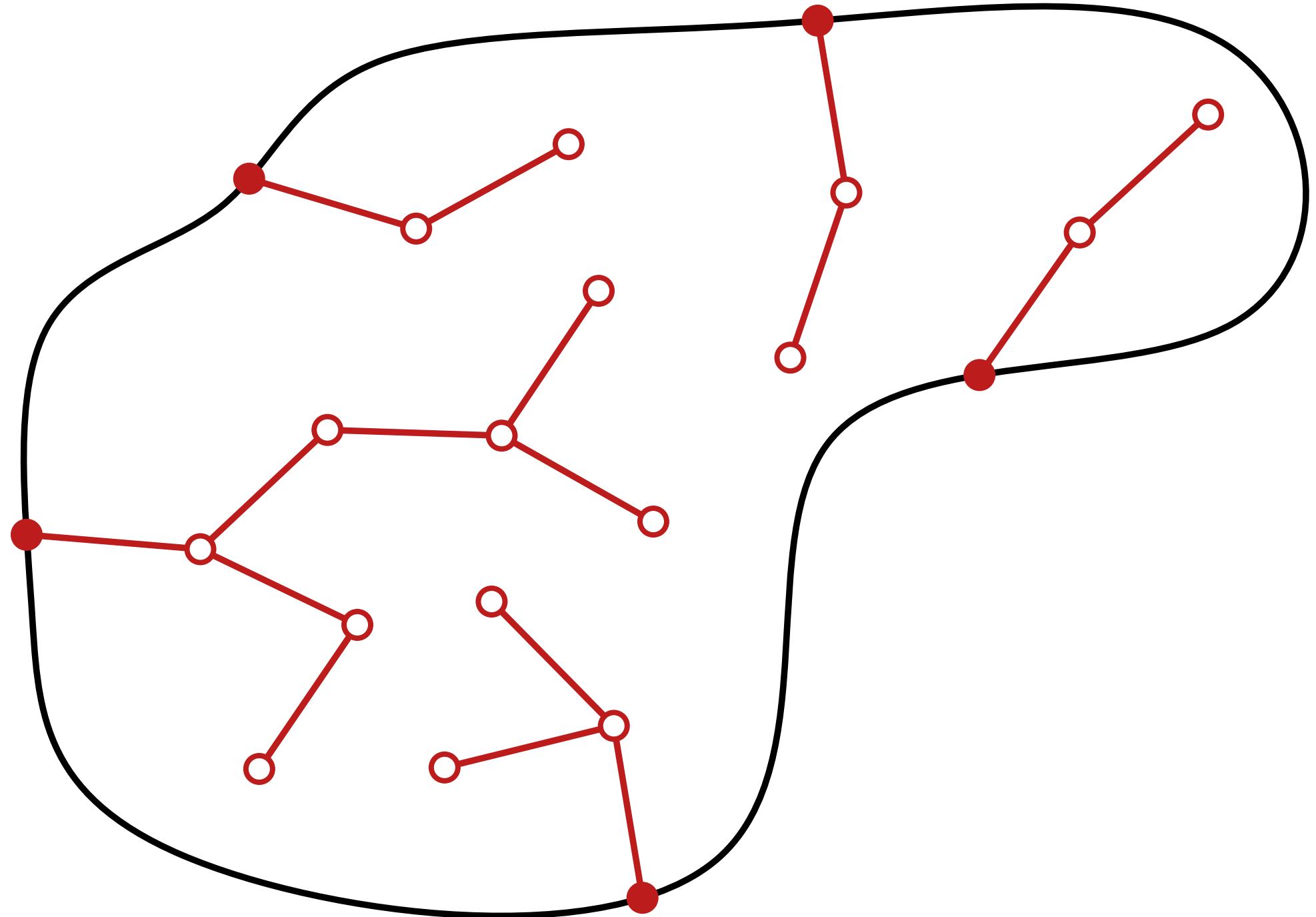


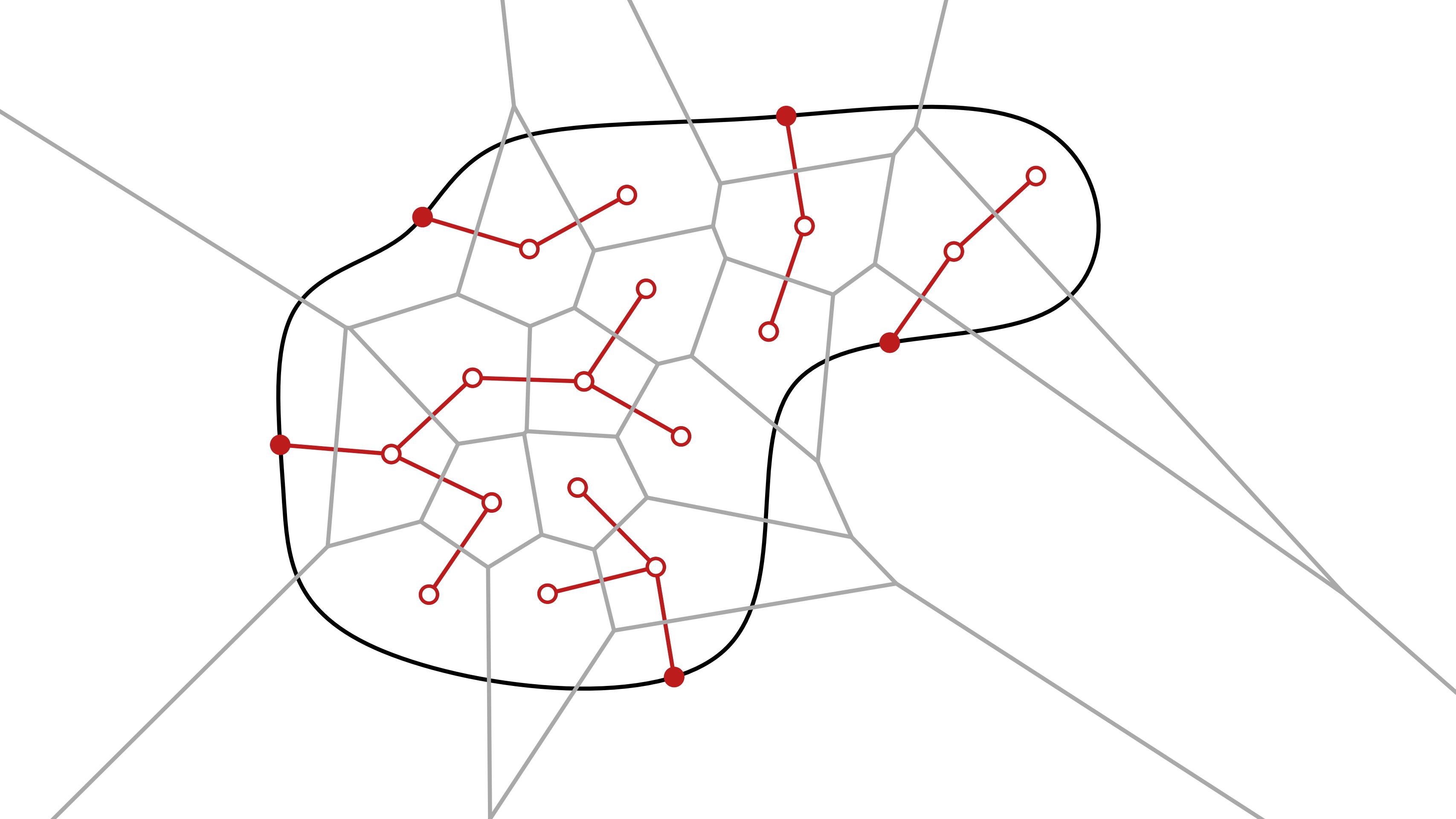


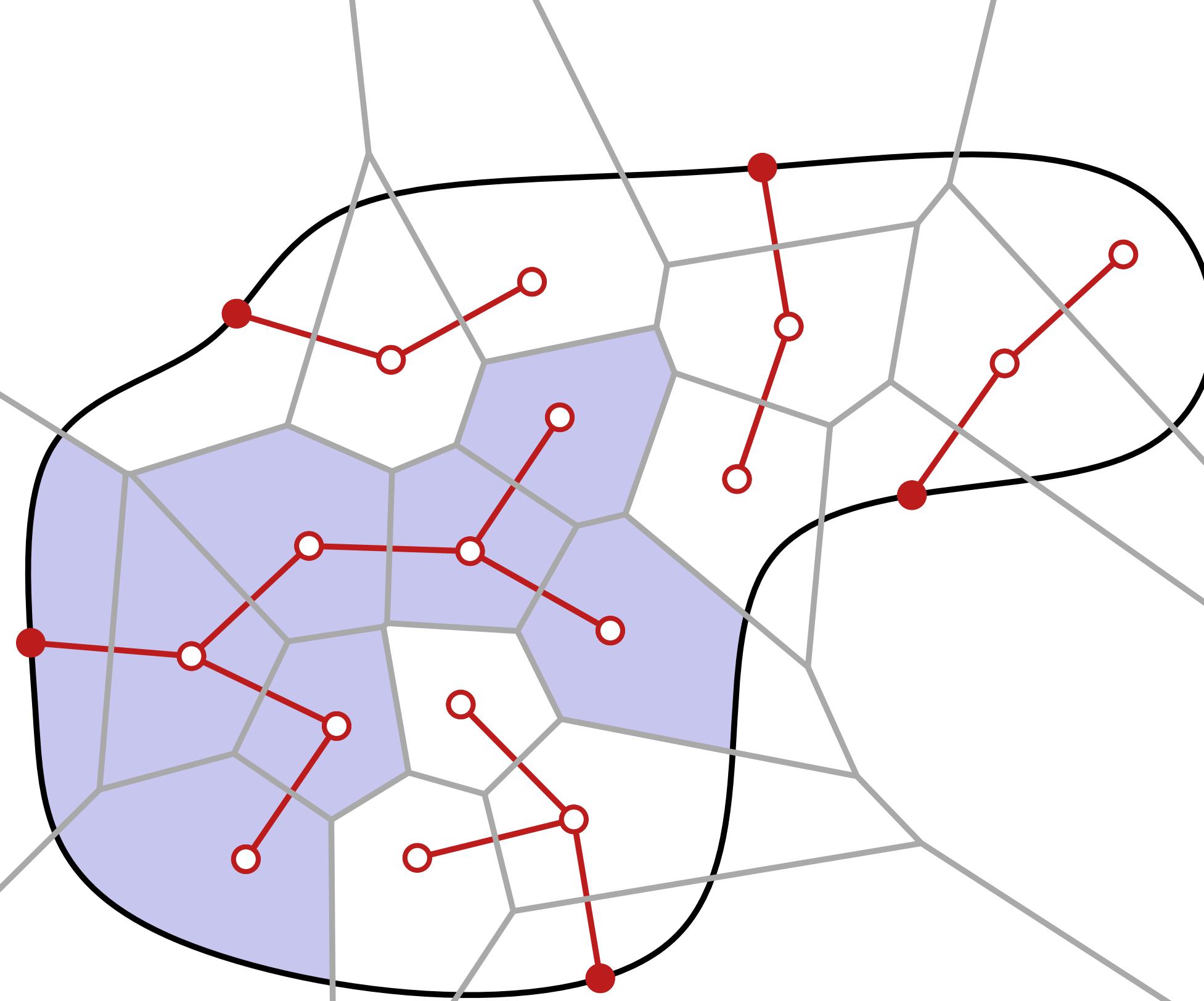


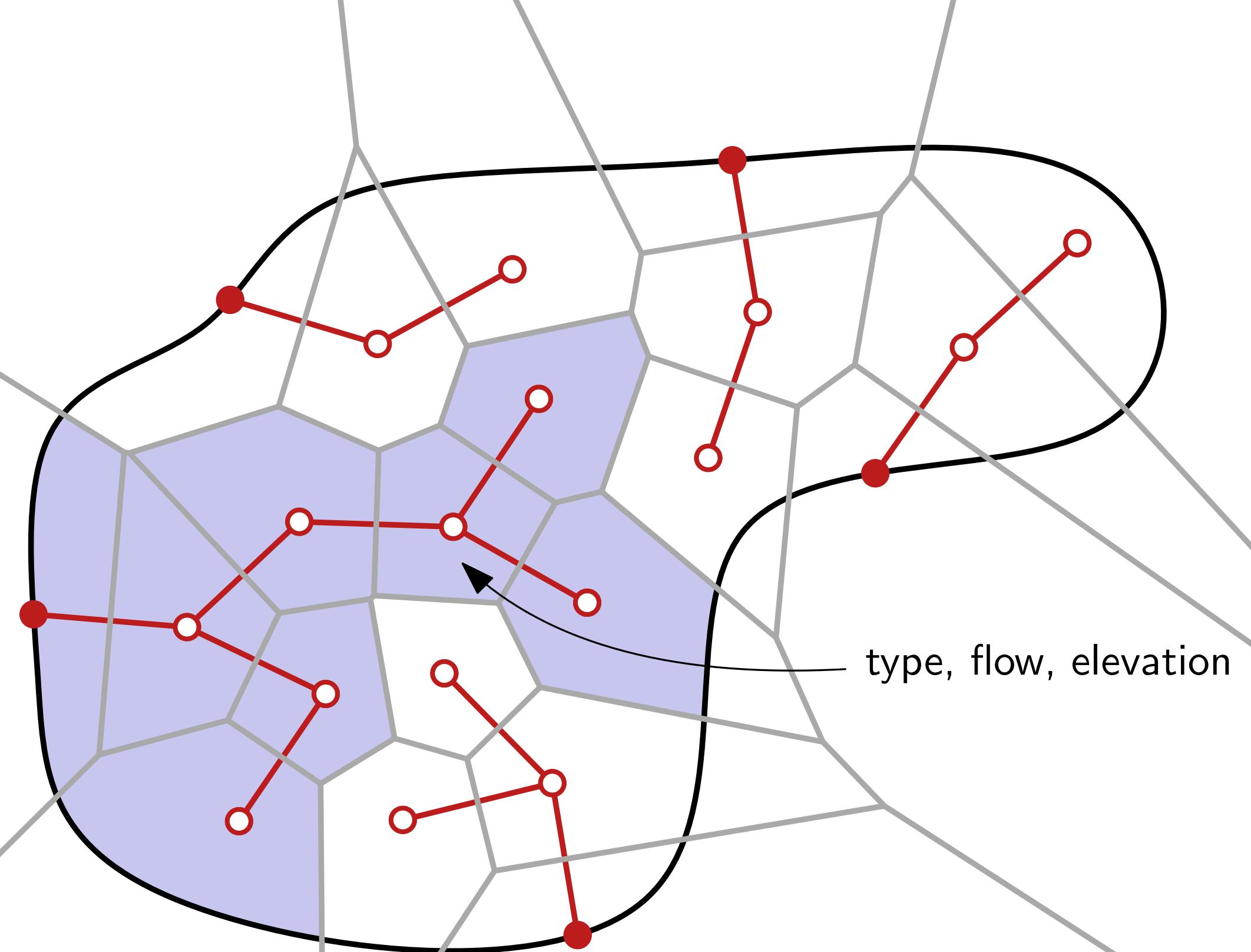




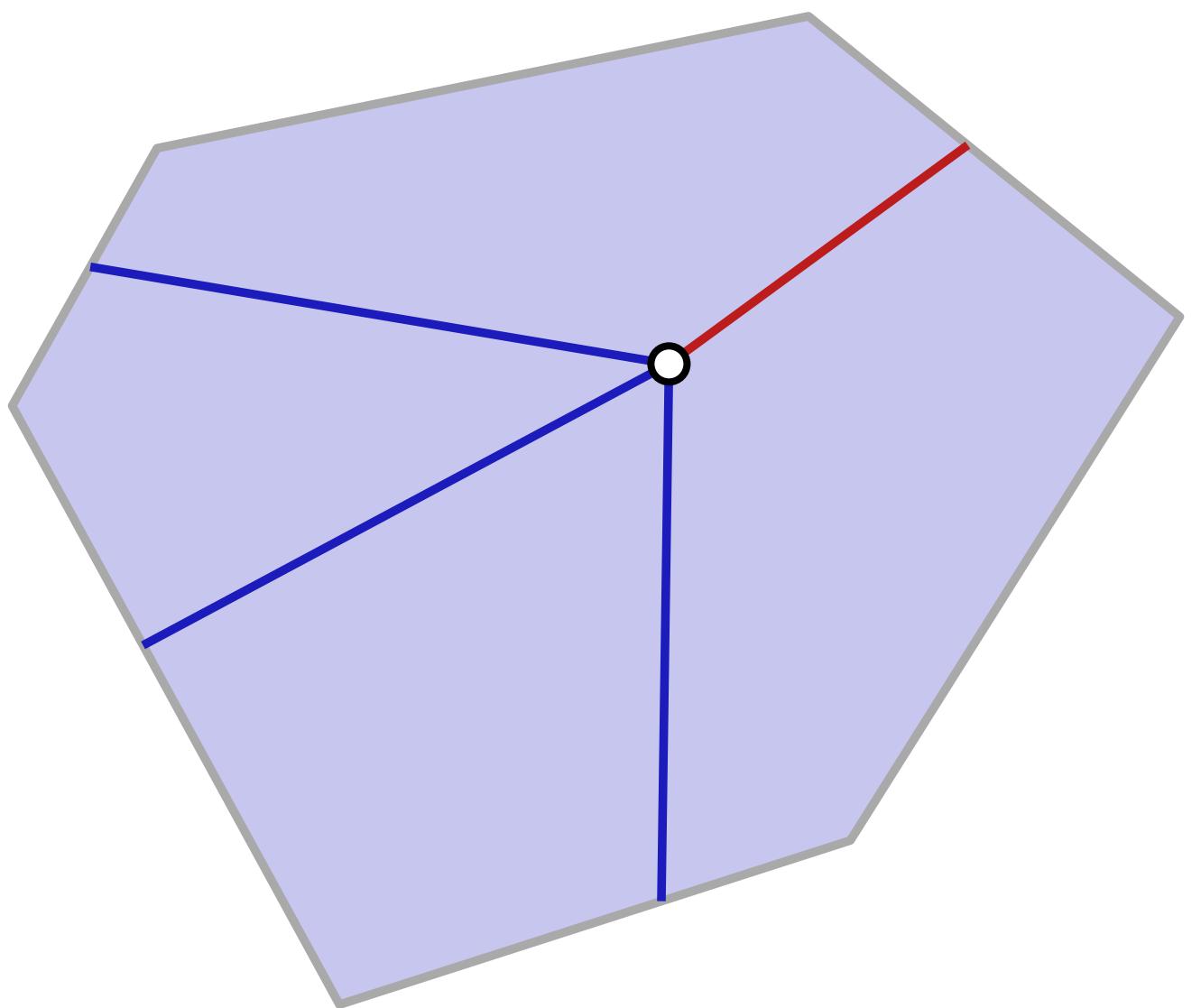


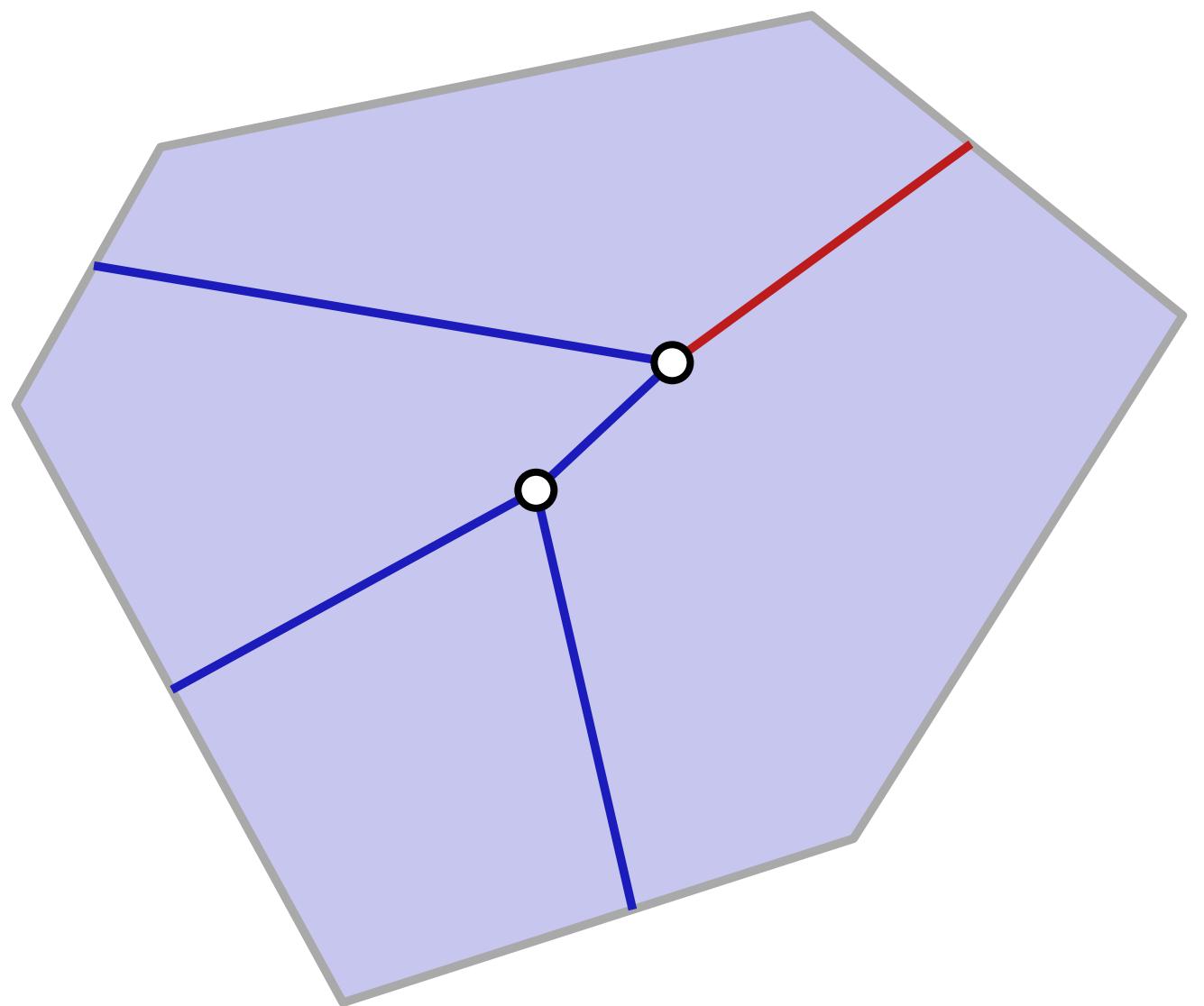


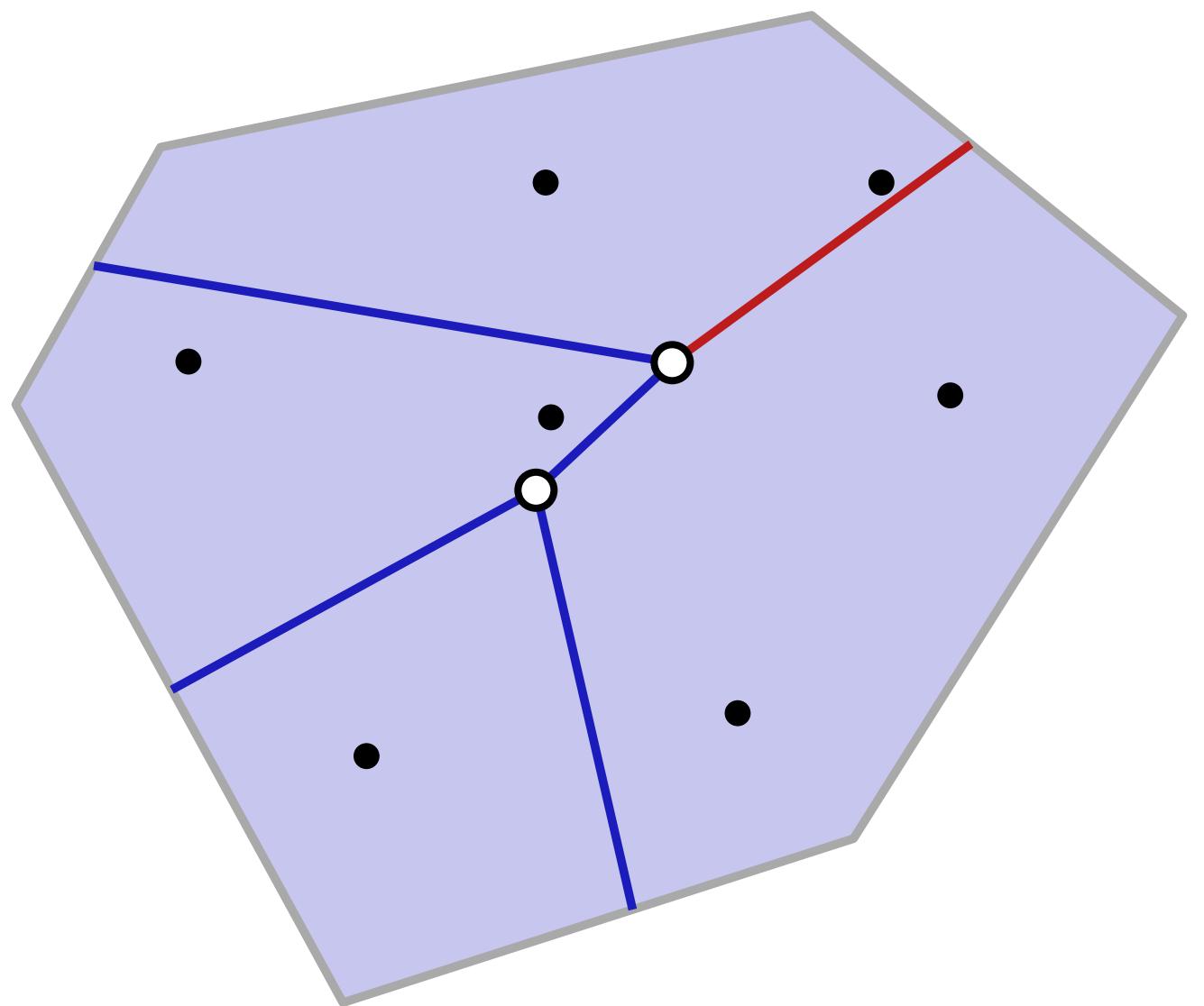


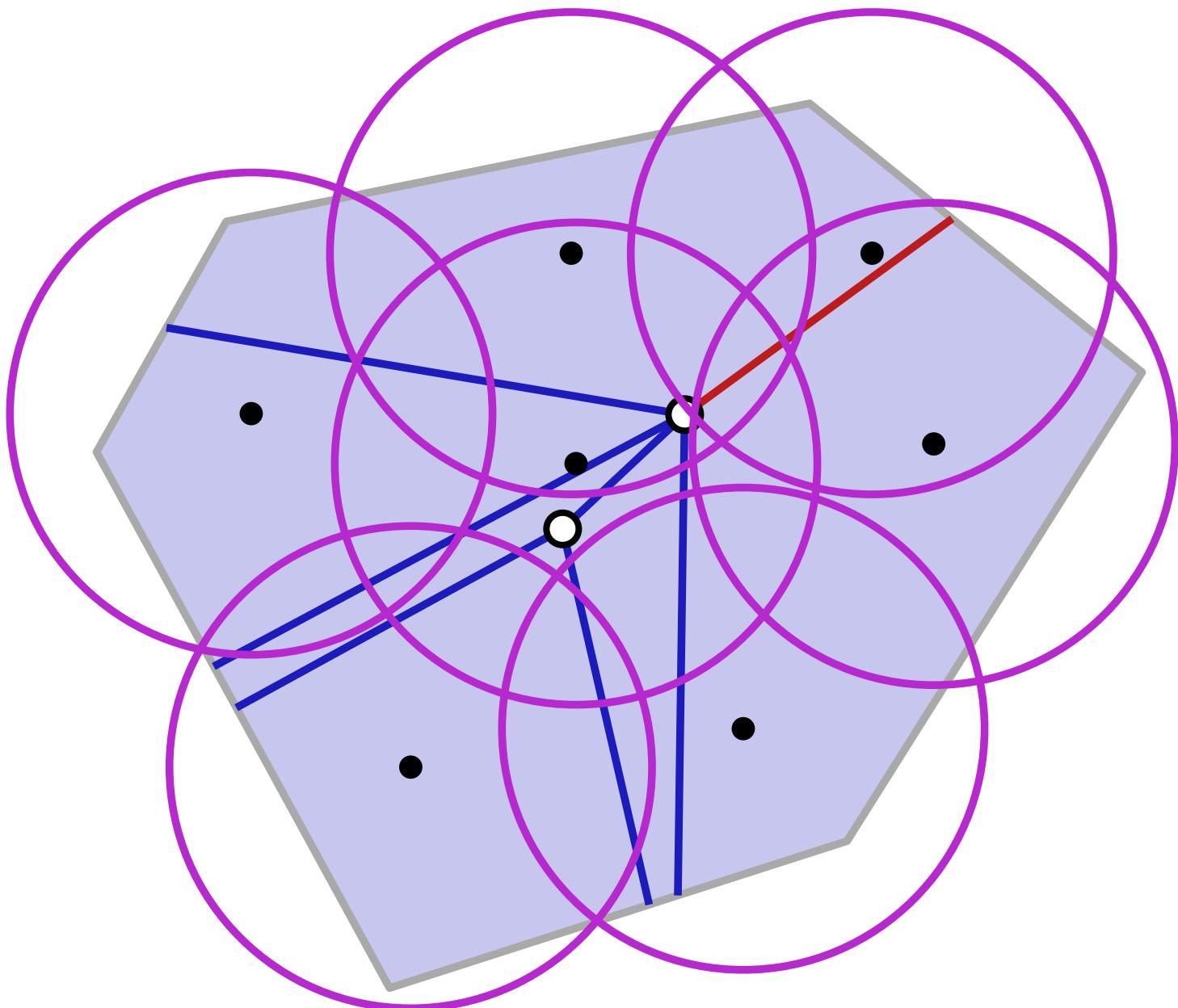


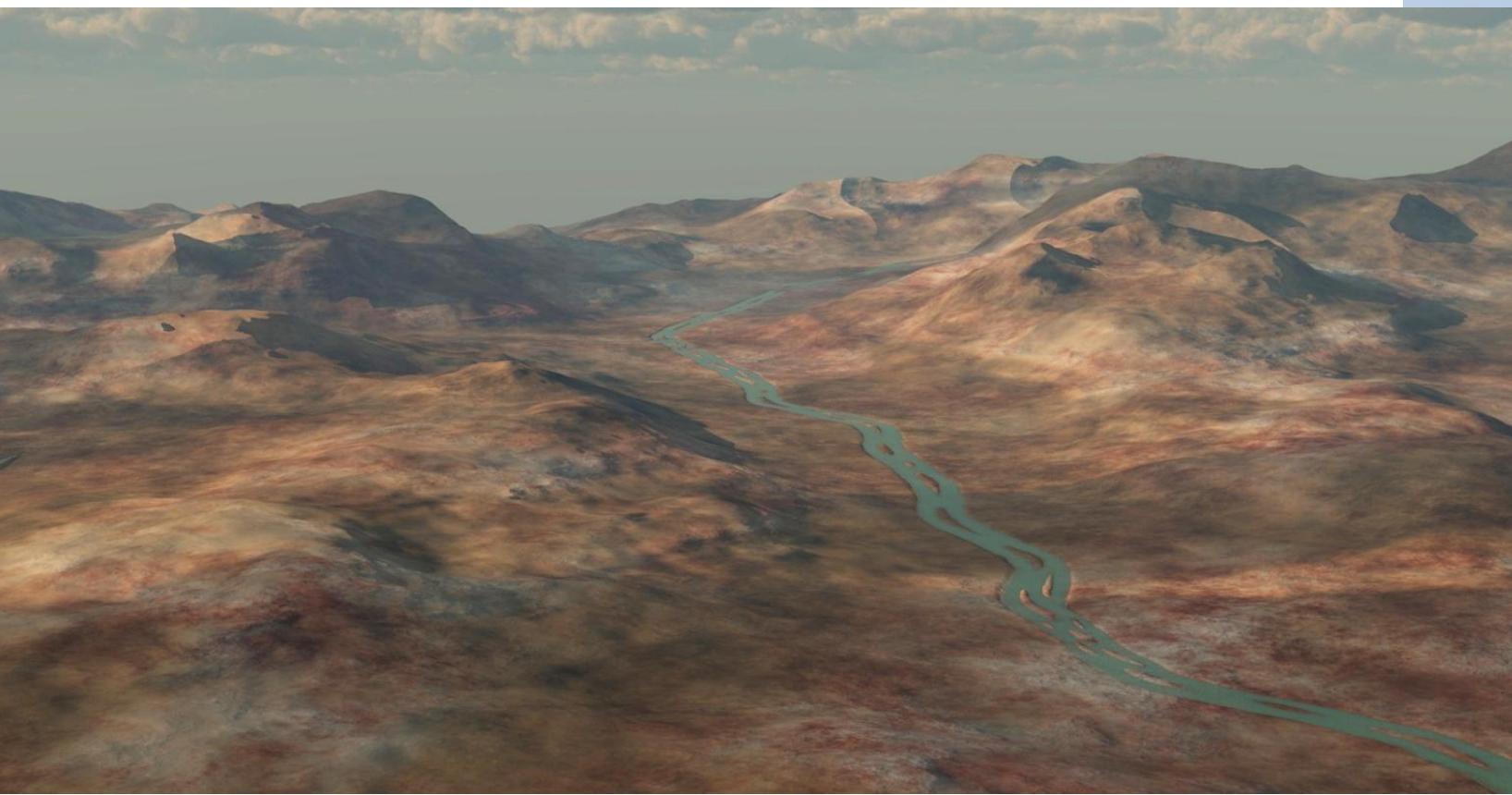
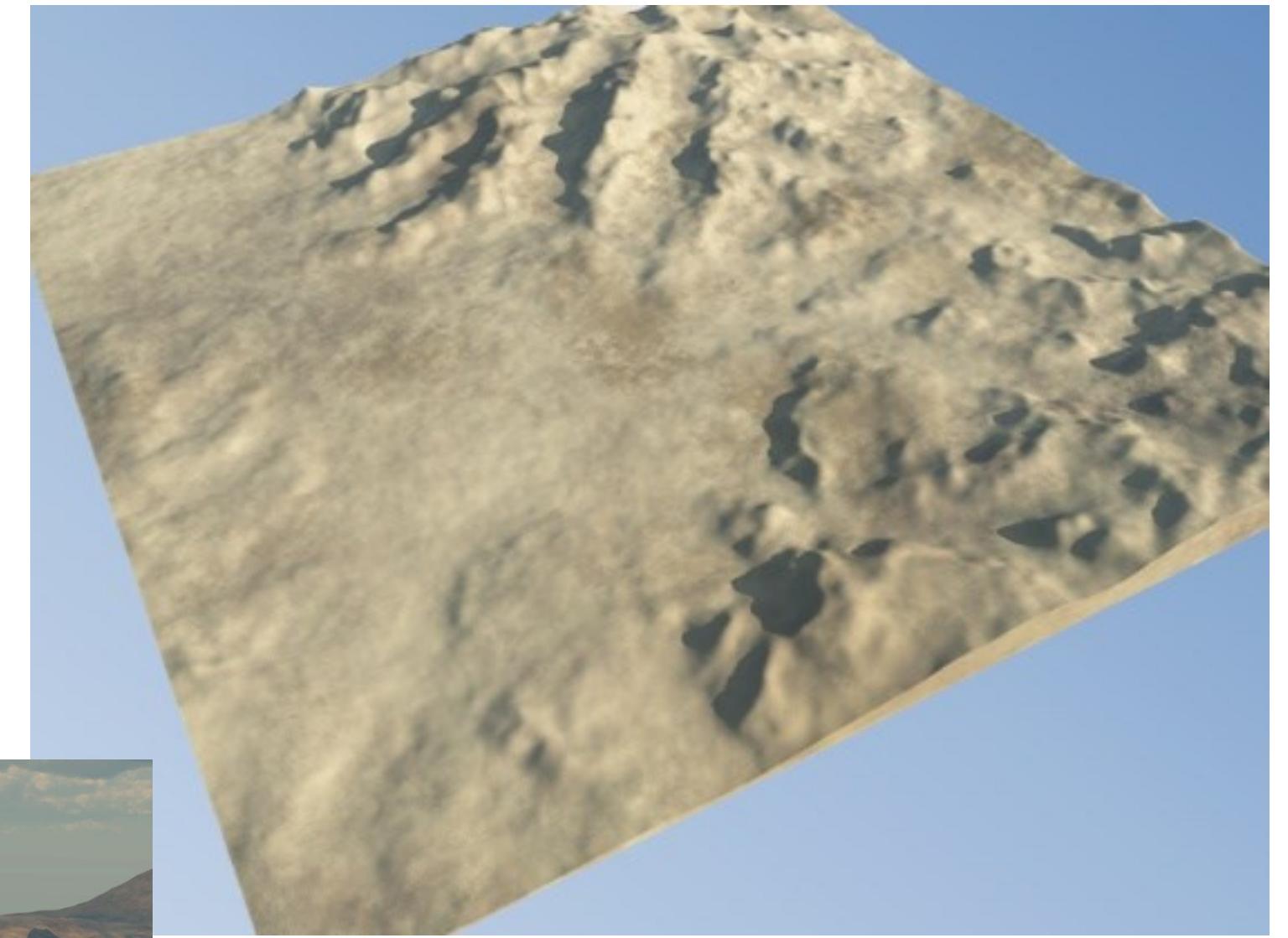
type, flow, elevation











# Assignment 2

The method we discussed builds the terrain starting from a river network. This may give problems with the detail of the terrain in areas far away from any rivers. Why is this the case?

# Large Scale Terrain Generation from Tectonic Uplift and Fluvial Erosion

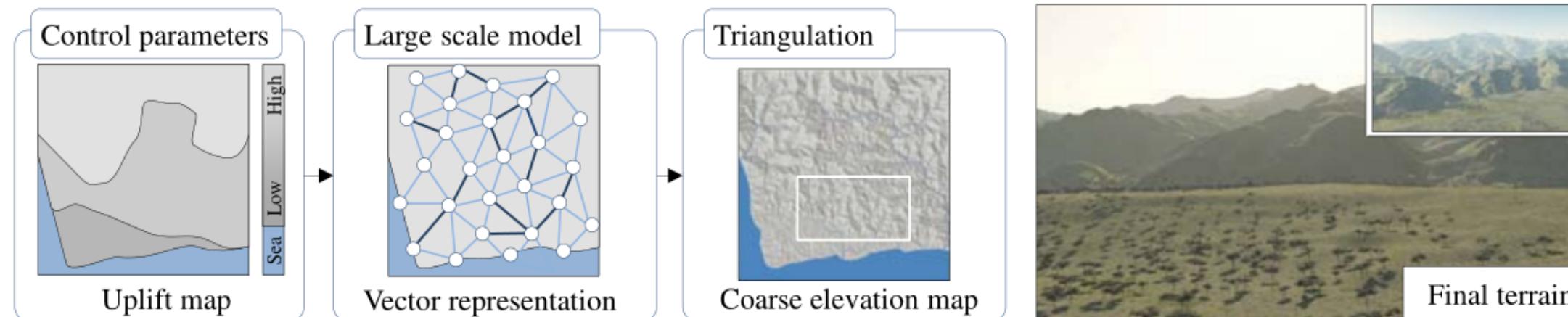
Guillaume Cordonnier<sup>1</sup>, Jean Braun<sup>2</sup>, Marie-Paule Cani<sup>1</sup>, Bedrich Benes<sup>3</sup>, Éric Galin<sup>4</sup>, Adrien Peytavie<sup>4</sup> and Éric Guérin<sup>4</sup>

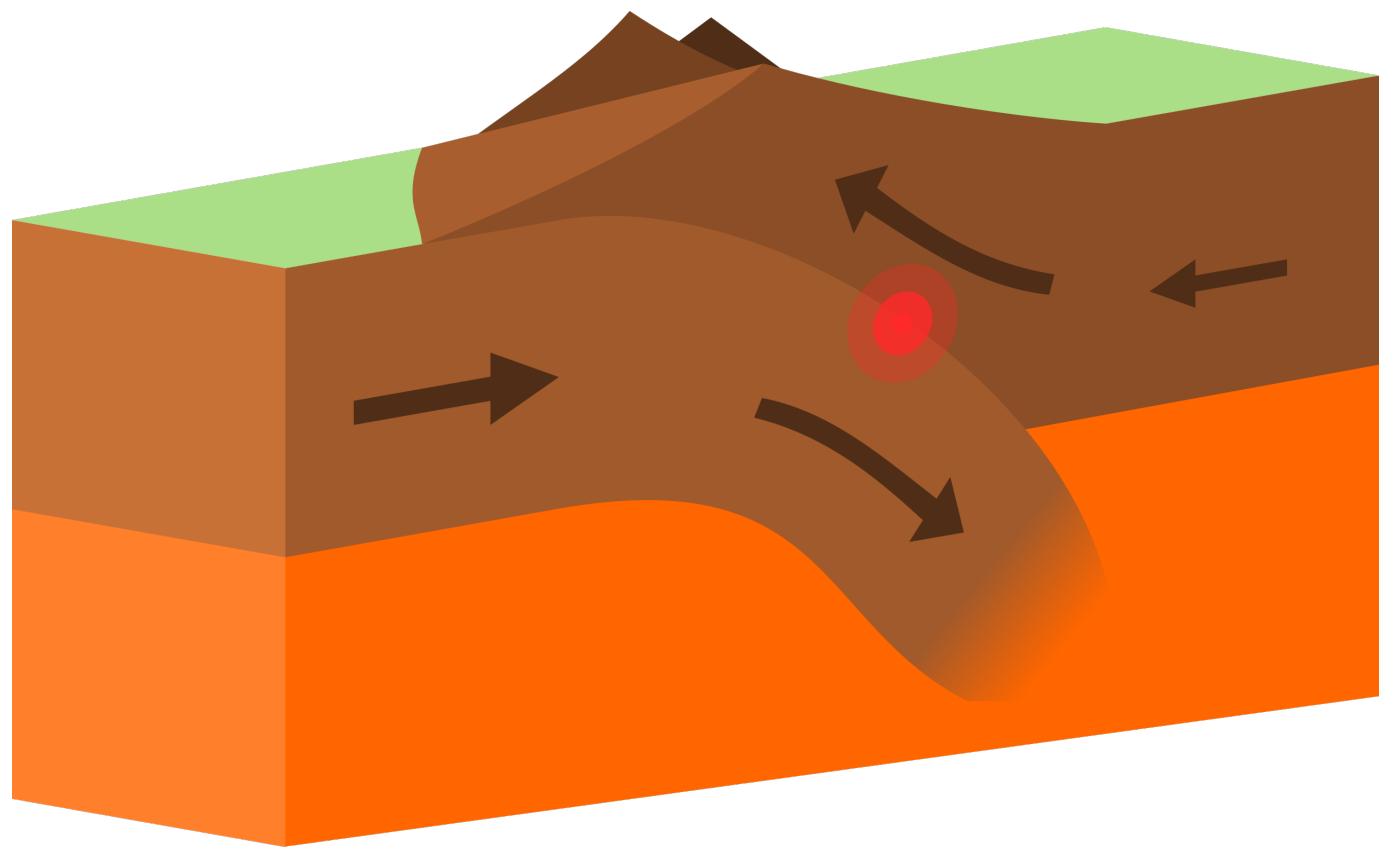
<sup>1</sup> Université Grenoble-Alpes and INRIA, France

<sup>2</sup> ISTerre, Université Grenoble Alpes and CNRS, BP 53, 38041 Grenoble Cedex 9, France

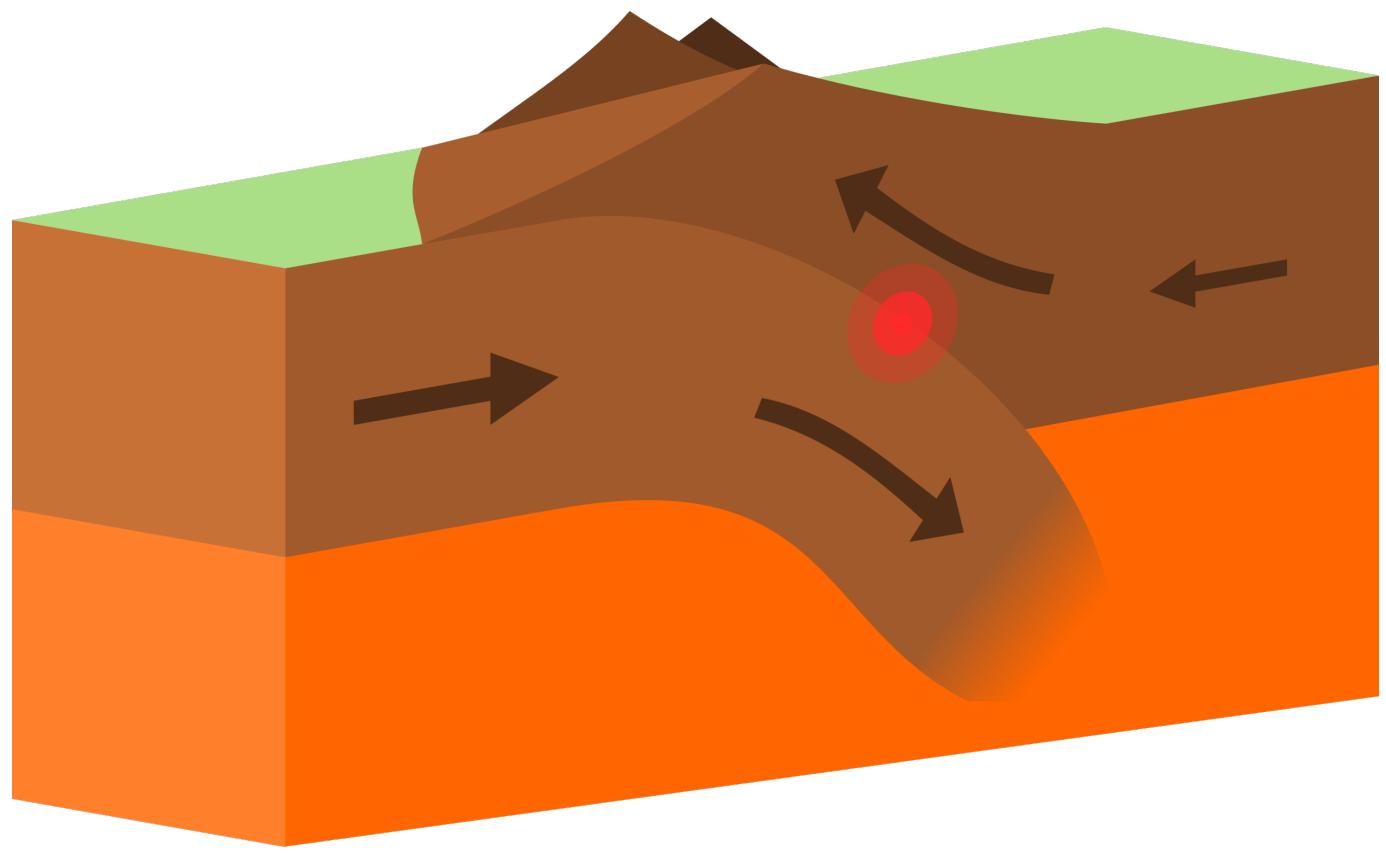
<sup>3</sup> Purdue University, West Lafayette, IN, USA

<sup>4</sup> Université de Lyon, LIRIS, CNRS, UMR5205, Lyon, France





[en.wikipedia.org/wiki/Plate\\_tectonics](https://en.wikipedia.org/wiki/Plate_tectonics)



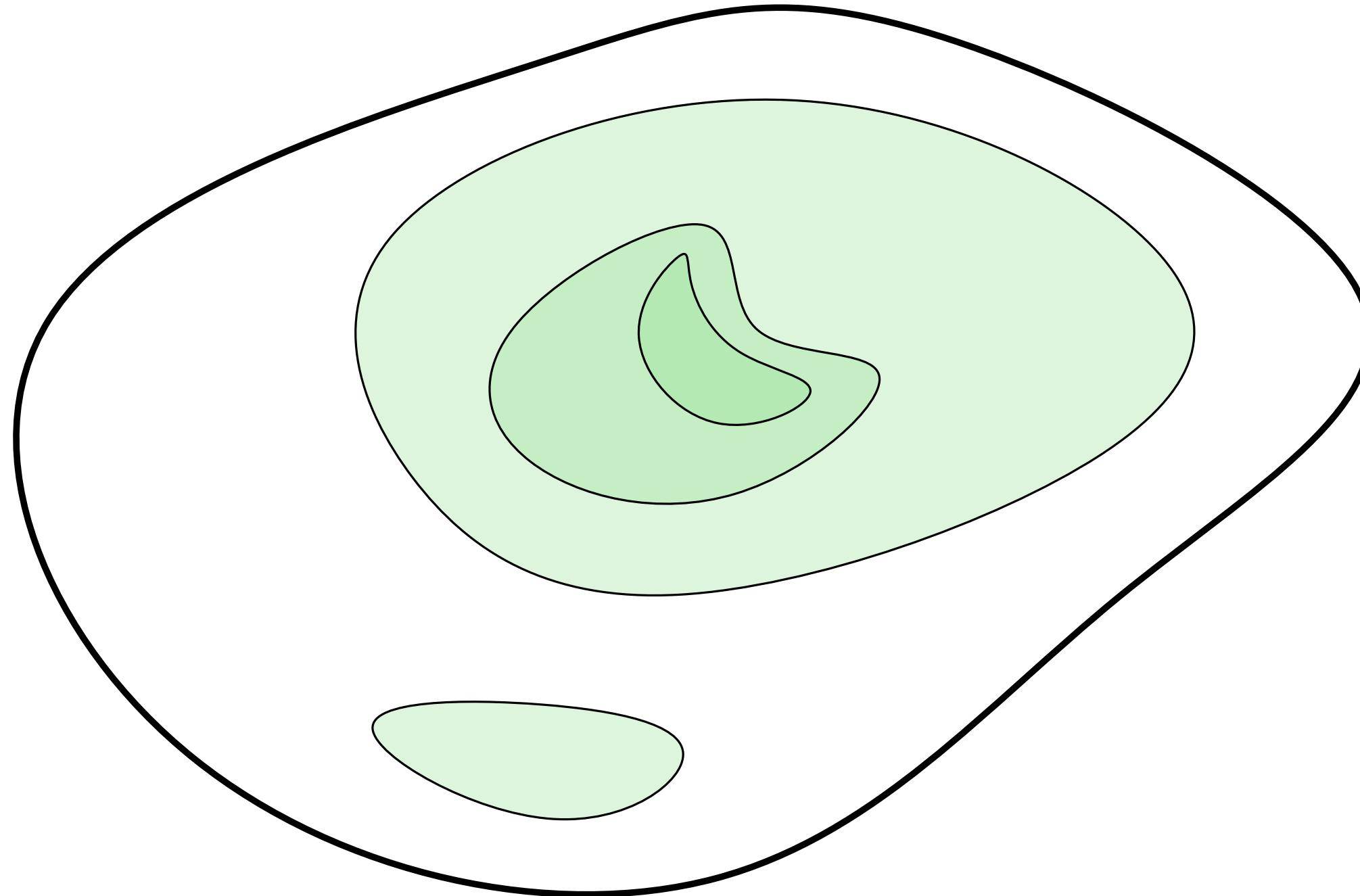
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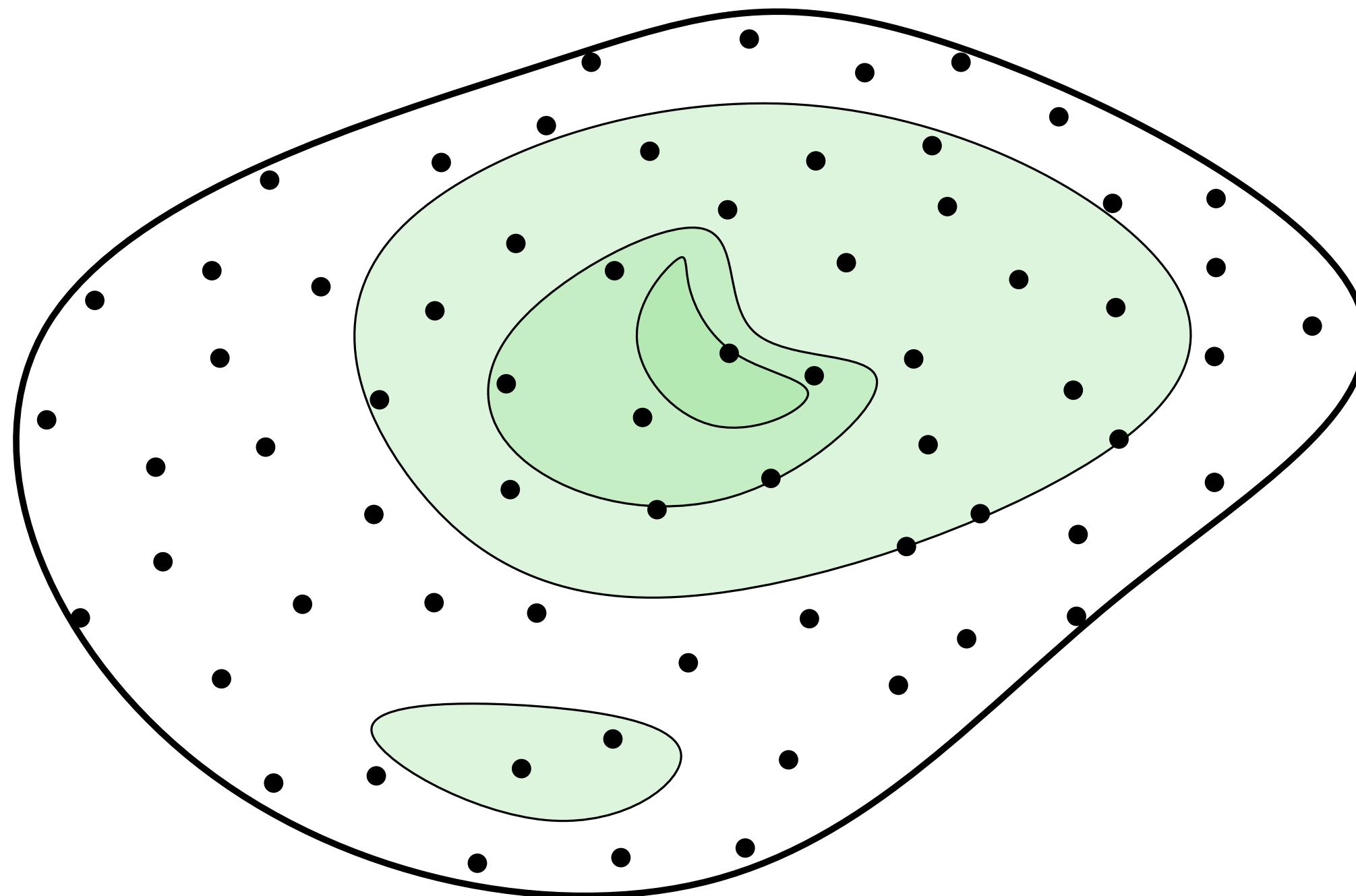


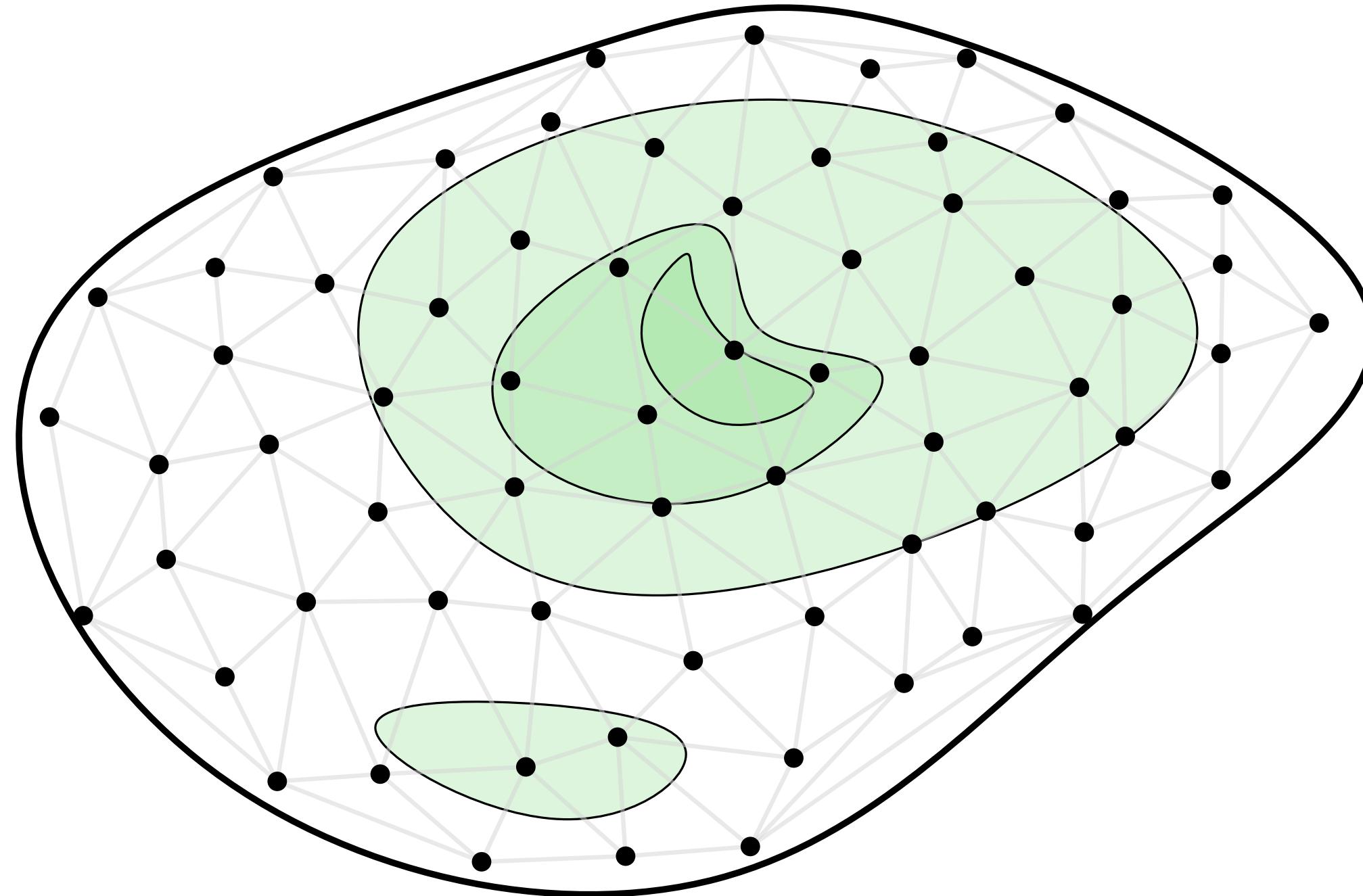
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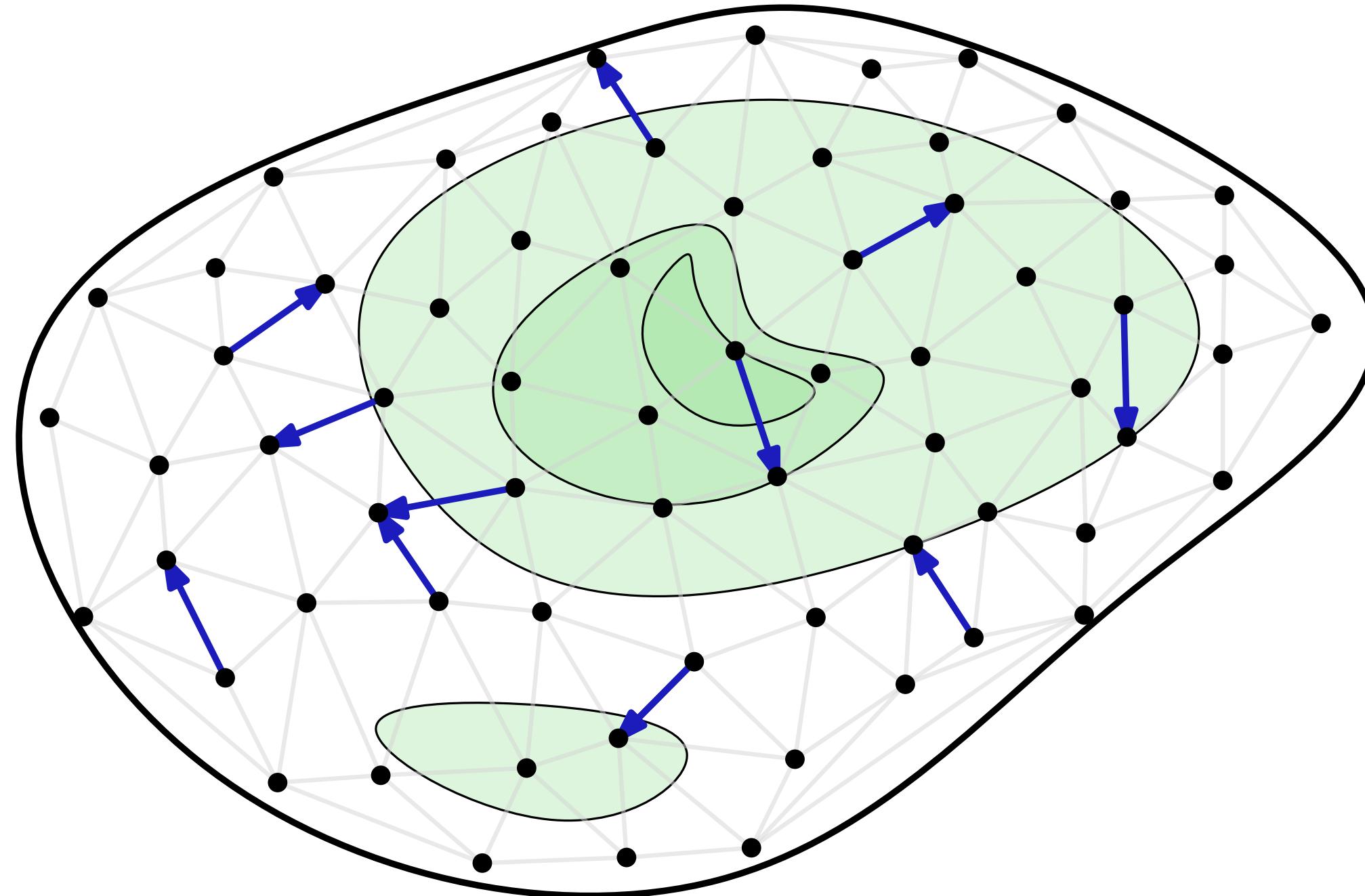
[en.wikipedia.org/wiki/Fluvial\\_erosion](https://en.wikipedia.org/wiki/Fluvial_erosion)

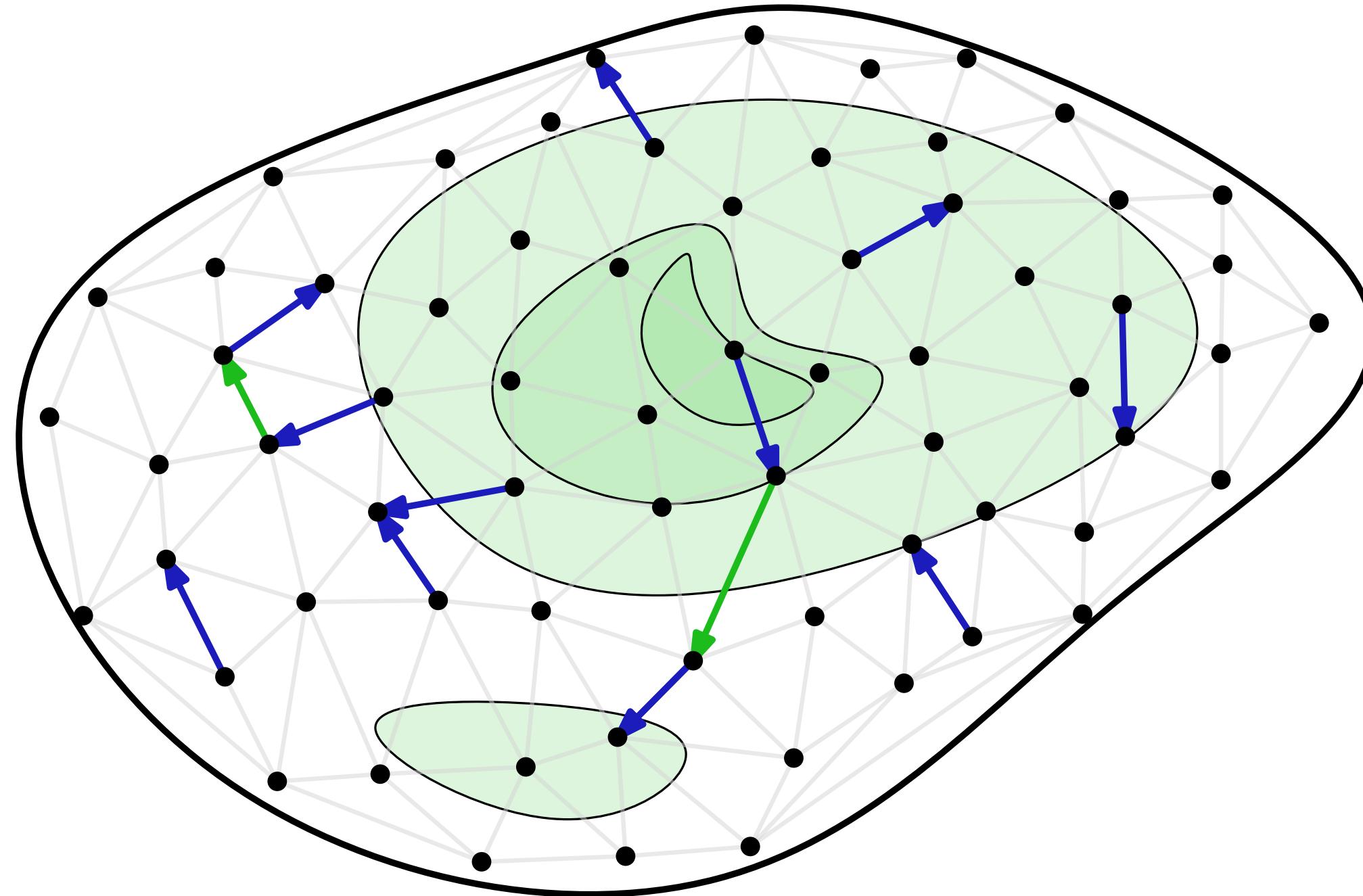


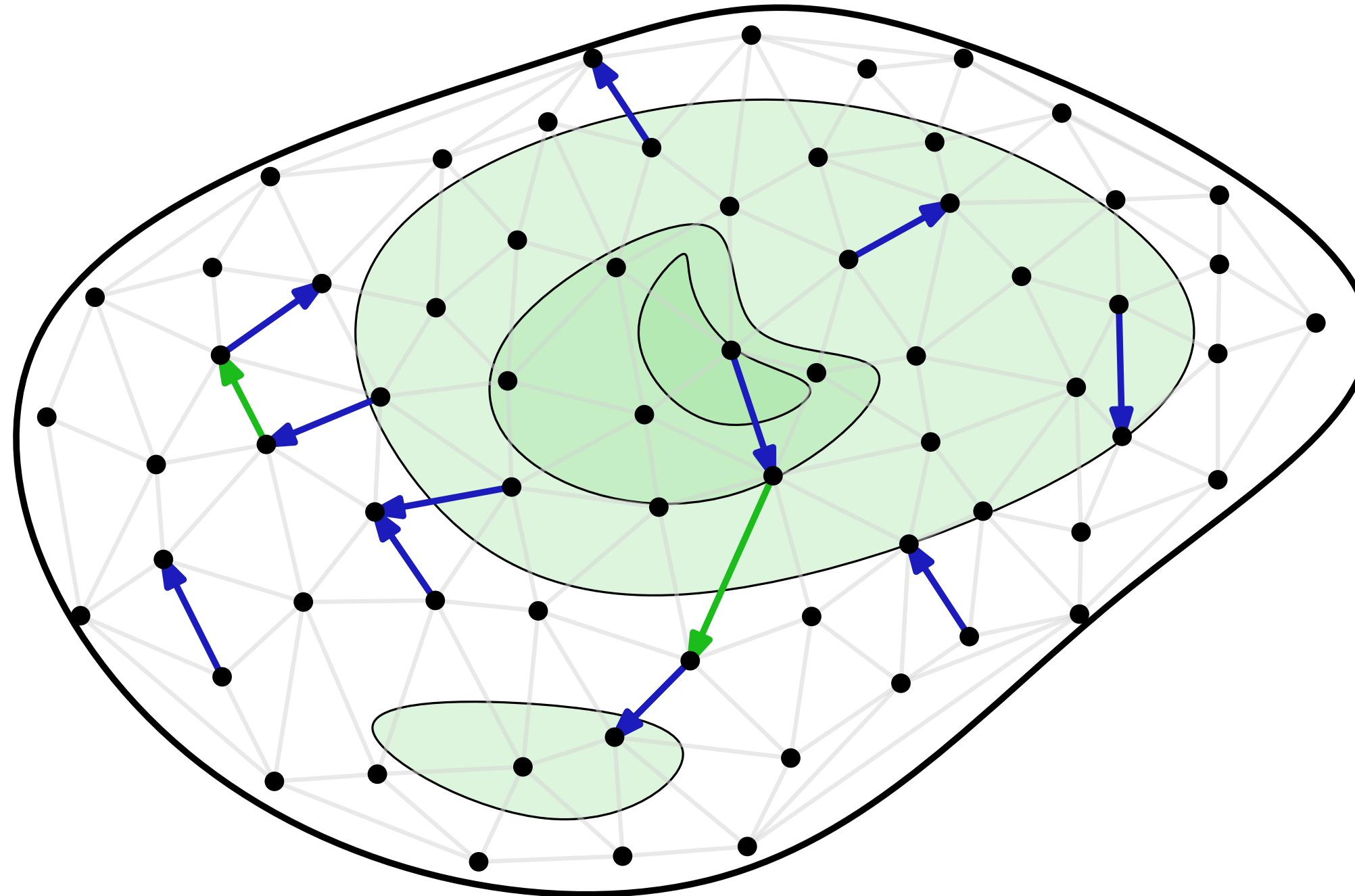




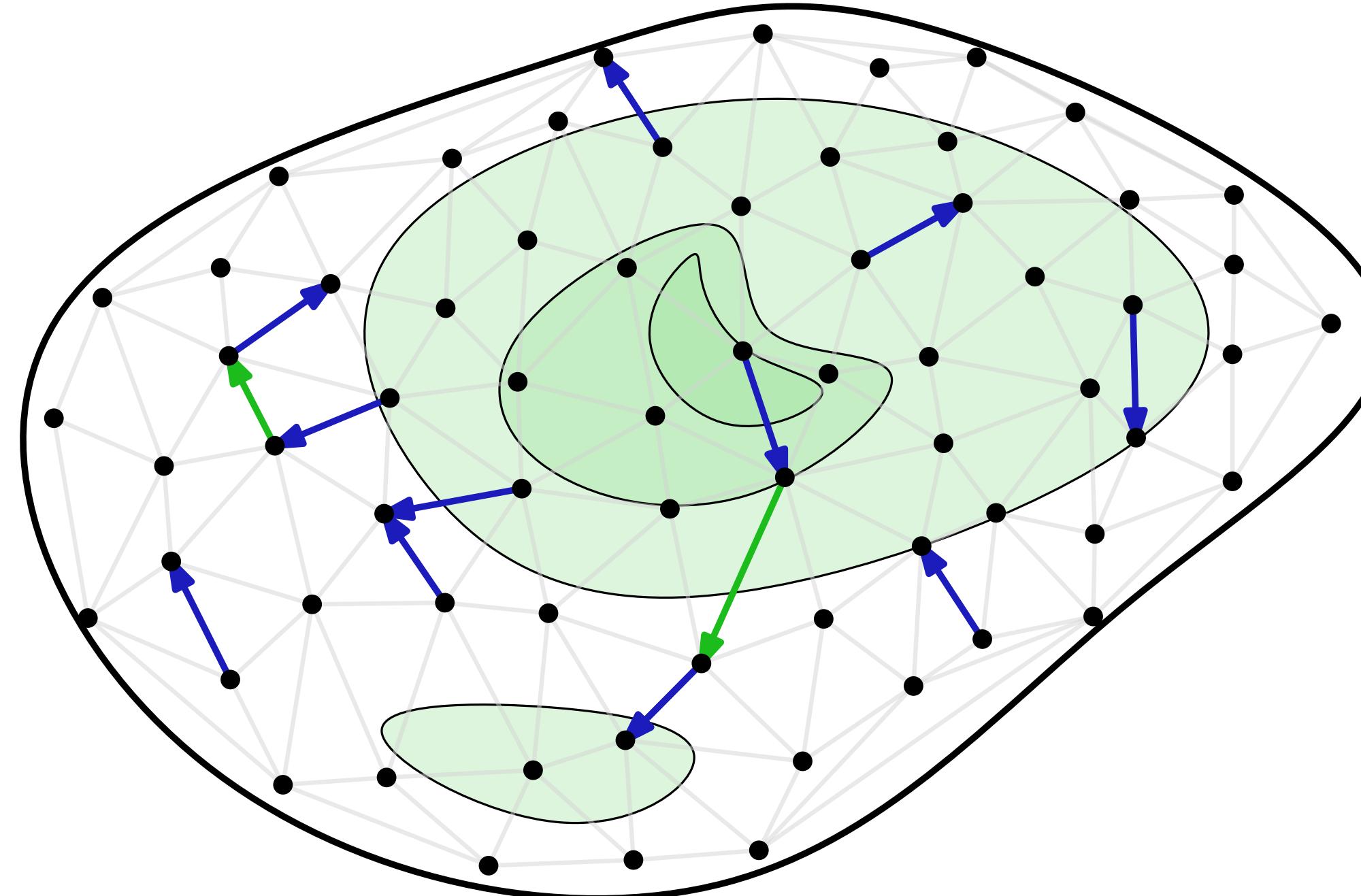








$$\frac{dh(\mathbf{p})}{dt} = u(\mathbf{p}) - kA(\mathbf{p})^m s(\mathbf{p})^n$$

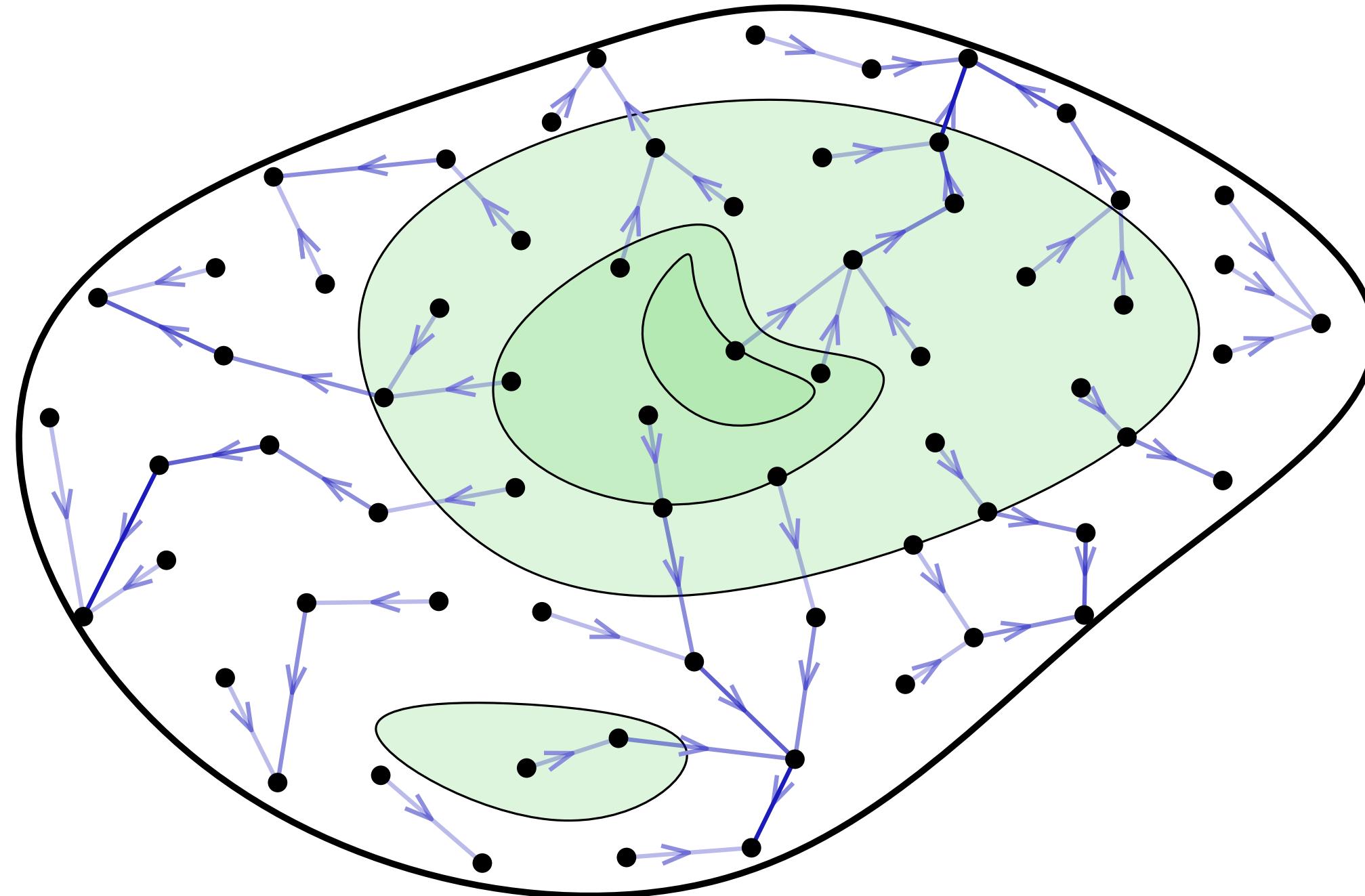


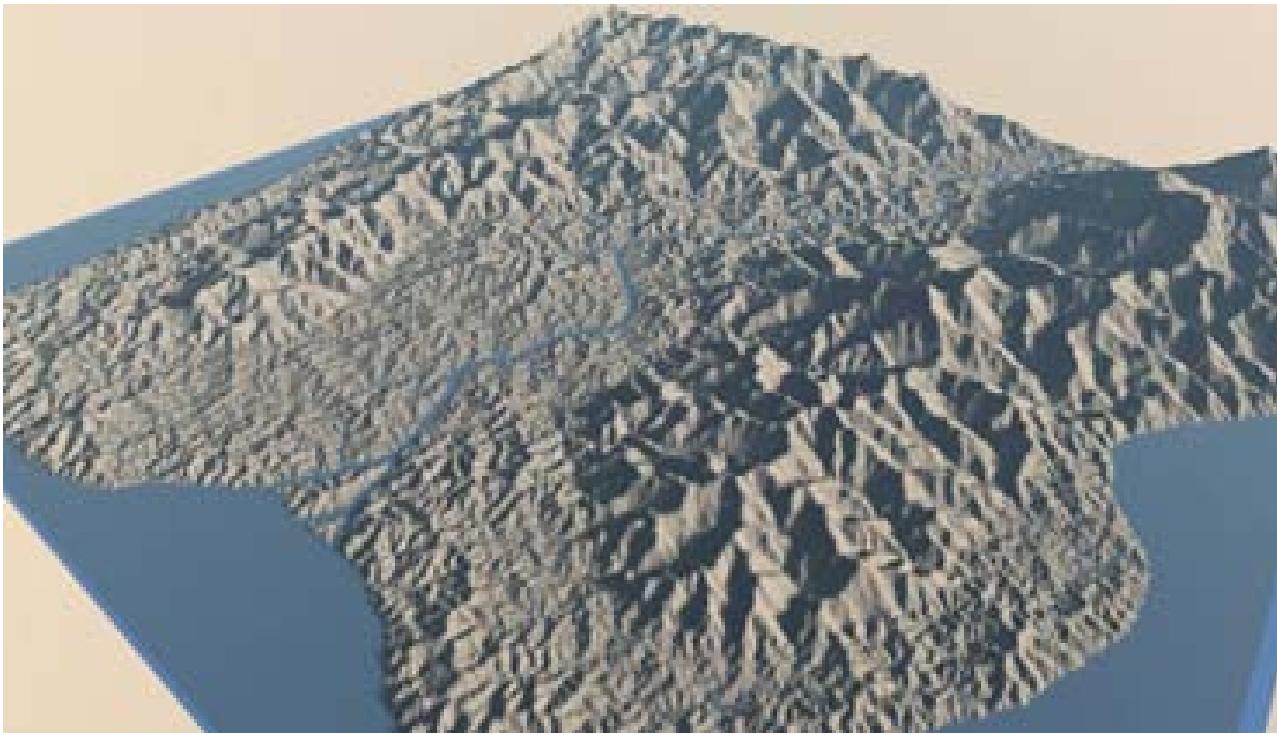
rate of change of height

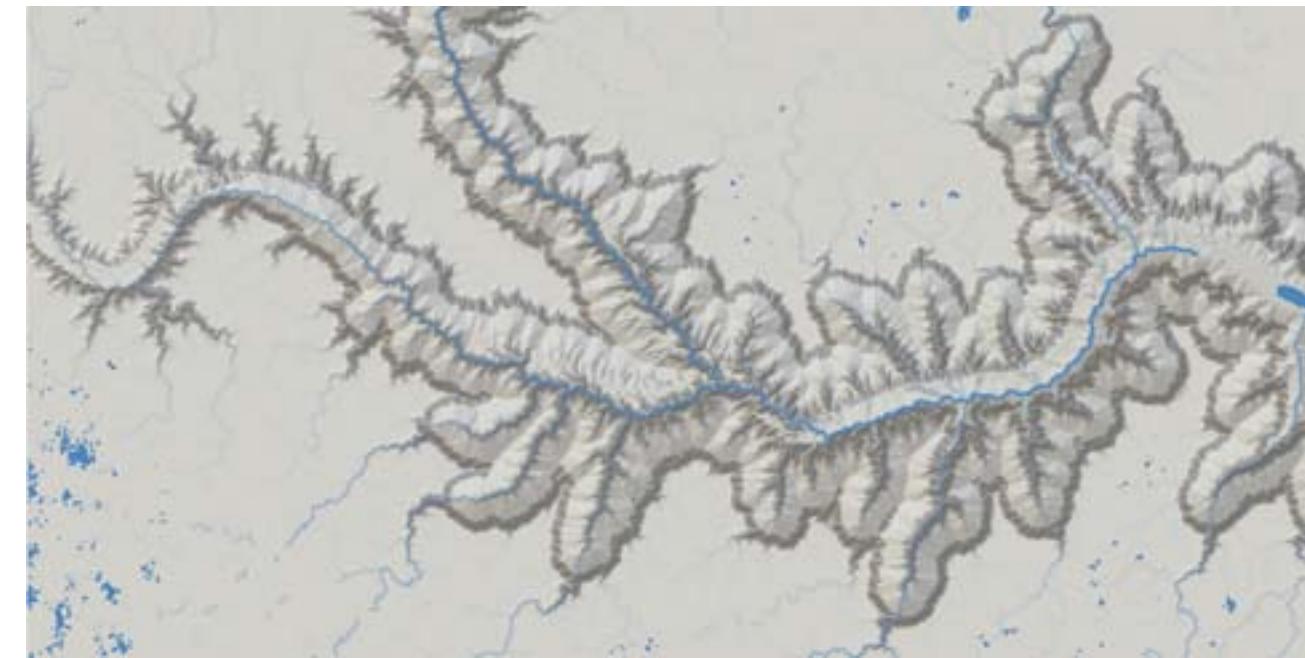
$$\frac{dh(\mathbf{p})}{dt} = u(\mathbf{p}) - kA(\mathbf{p})^m s(\mathbf{p})^n$$

uplift

slope  
drainage







# Assignment 3

For this method, we fix the vertices of our graph at the start.  
What advantage does this give us compared to the previous method?

# Authoring Landscapes by Combining Ecosystem and Terrain Erosion Simulation

GUILLAUME CORDONNIER, Univ. Grenoble Alpes & CNRS (LJK) and Inria

ERIC GALIN, Univ Lyon, Université Lyon 2, CNRS, LIRIS

JAMES GAIN, University of Cape Town

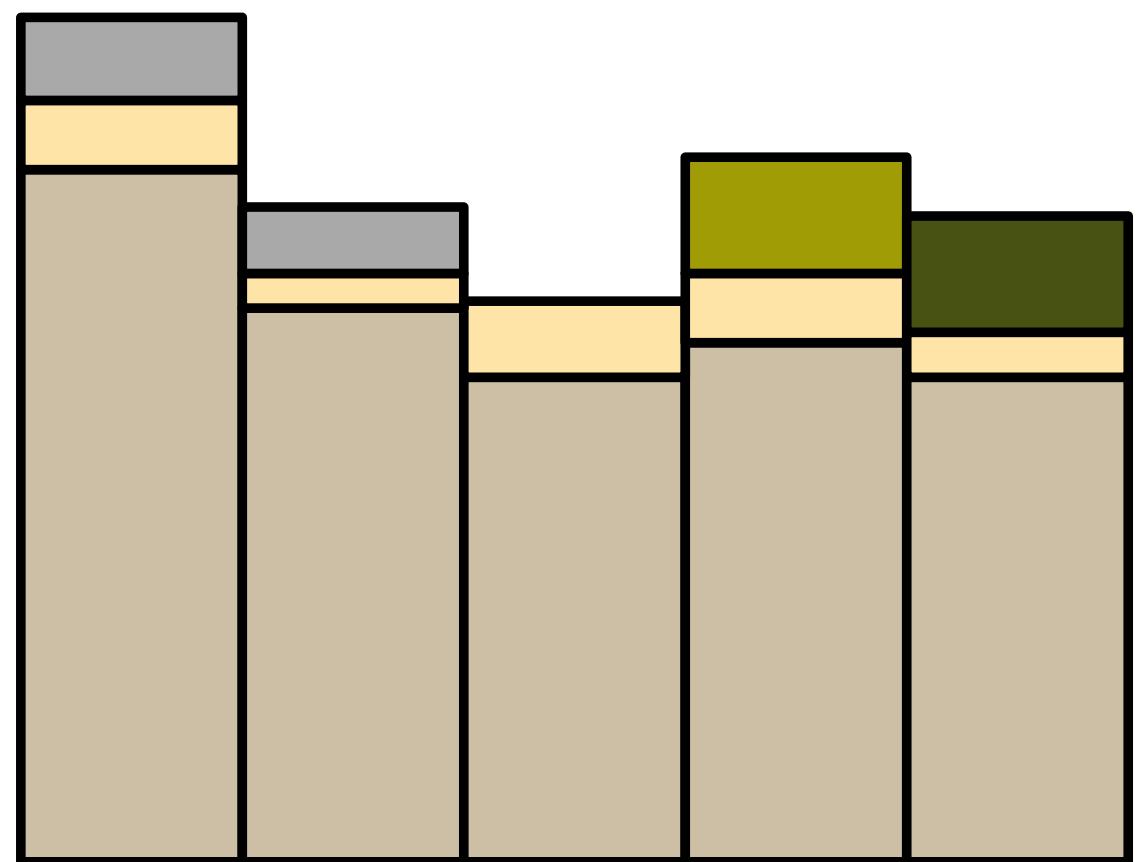
BEDRICH BENES, Purdue University

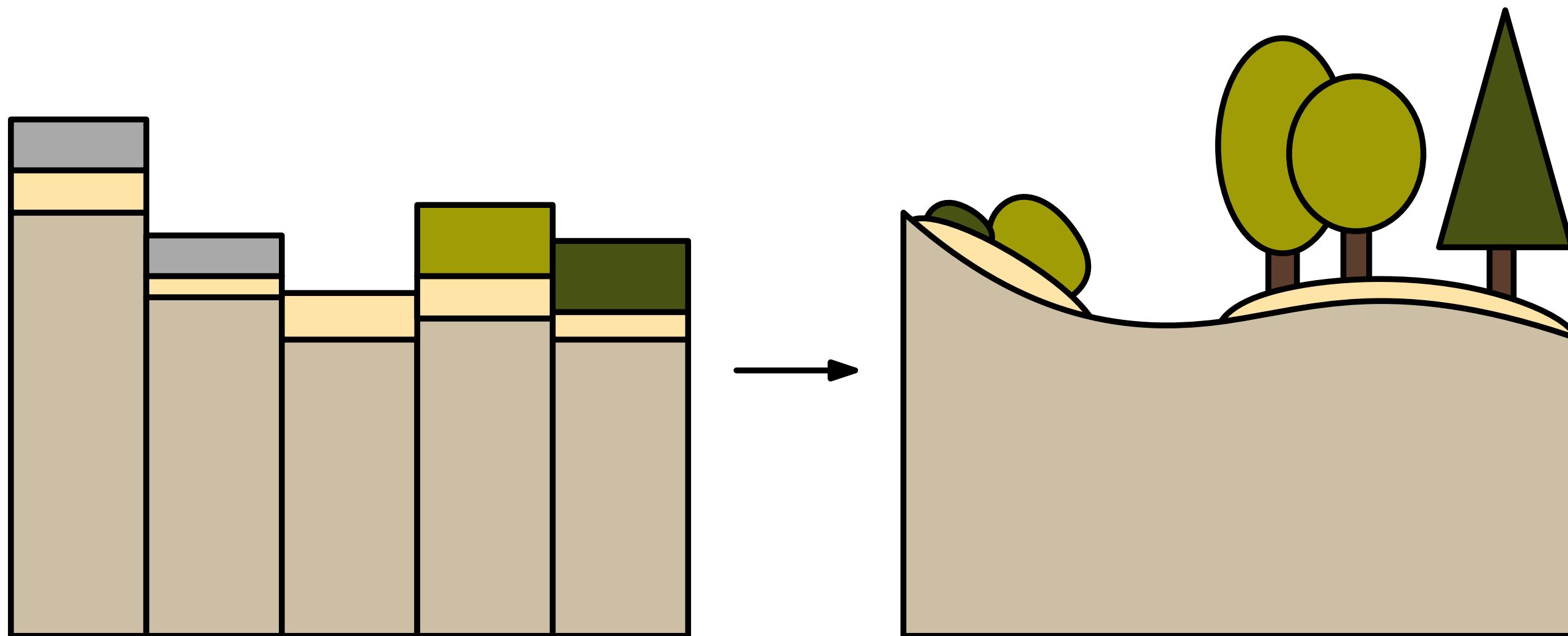
ERIC GUÉRIN, Univ Lyon, INSA-Lyon, CNRS, LIRIS

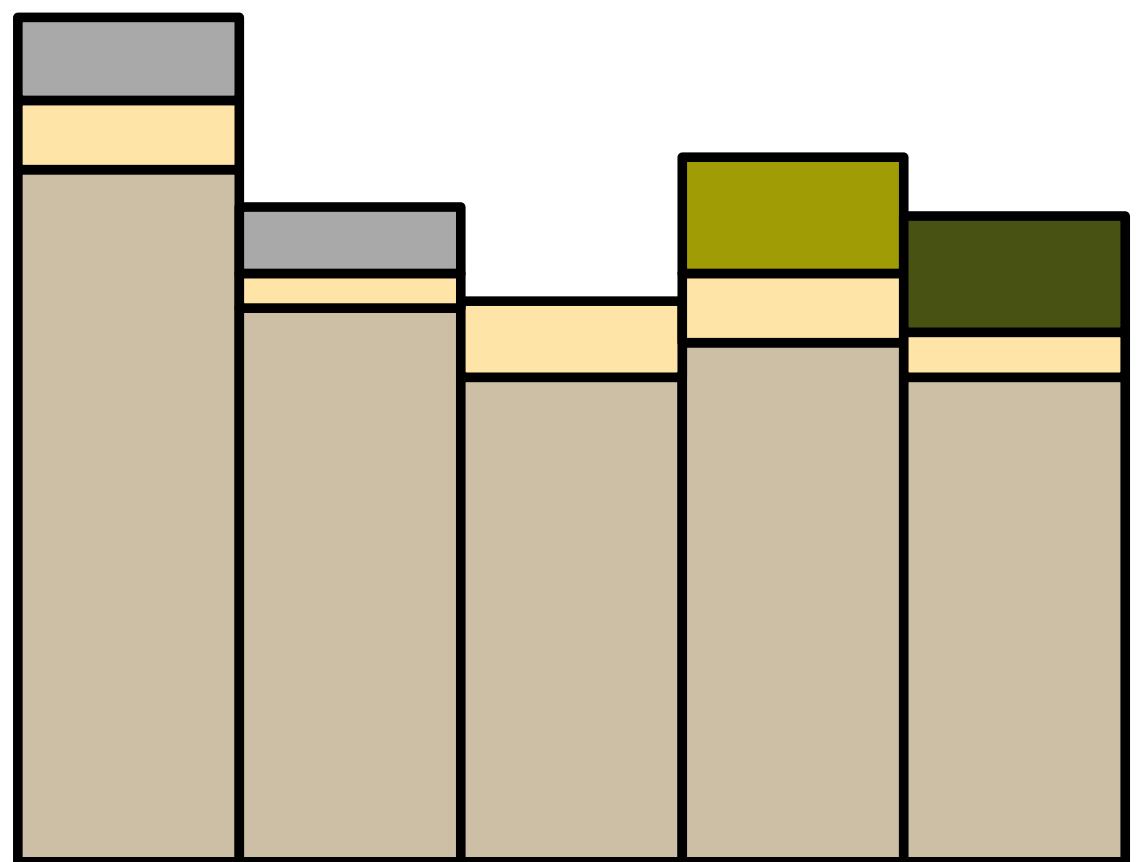
ADRIEN PEYTAVIE, Univ Lyon, Université Lyon 1, CNRS, LIRIS

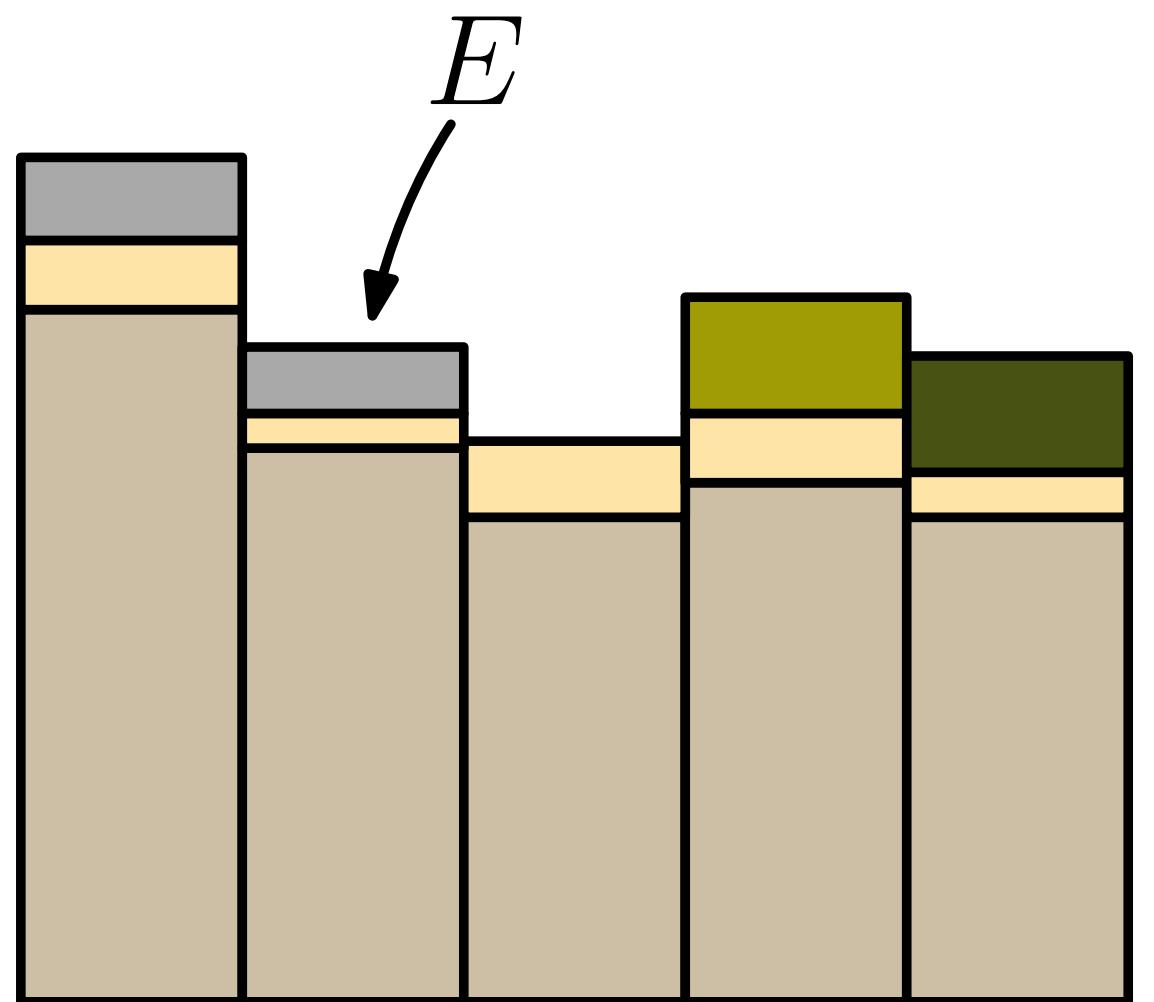
MARIE-PAULE CANI, Univ. Grenoble Alpes & CNRS (LJK) and Inria

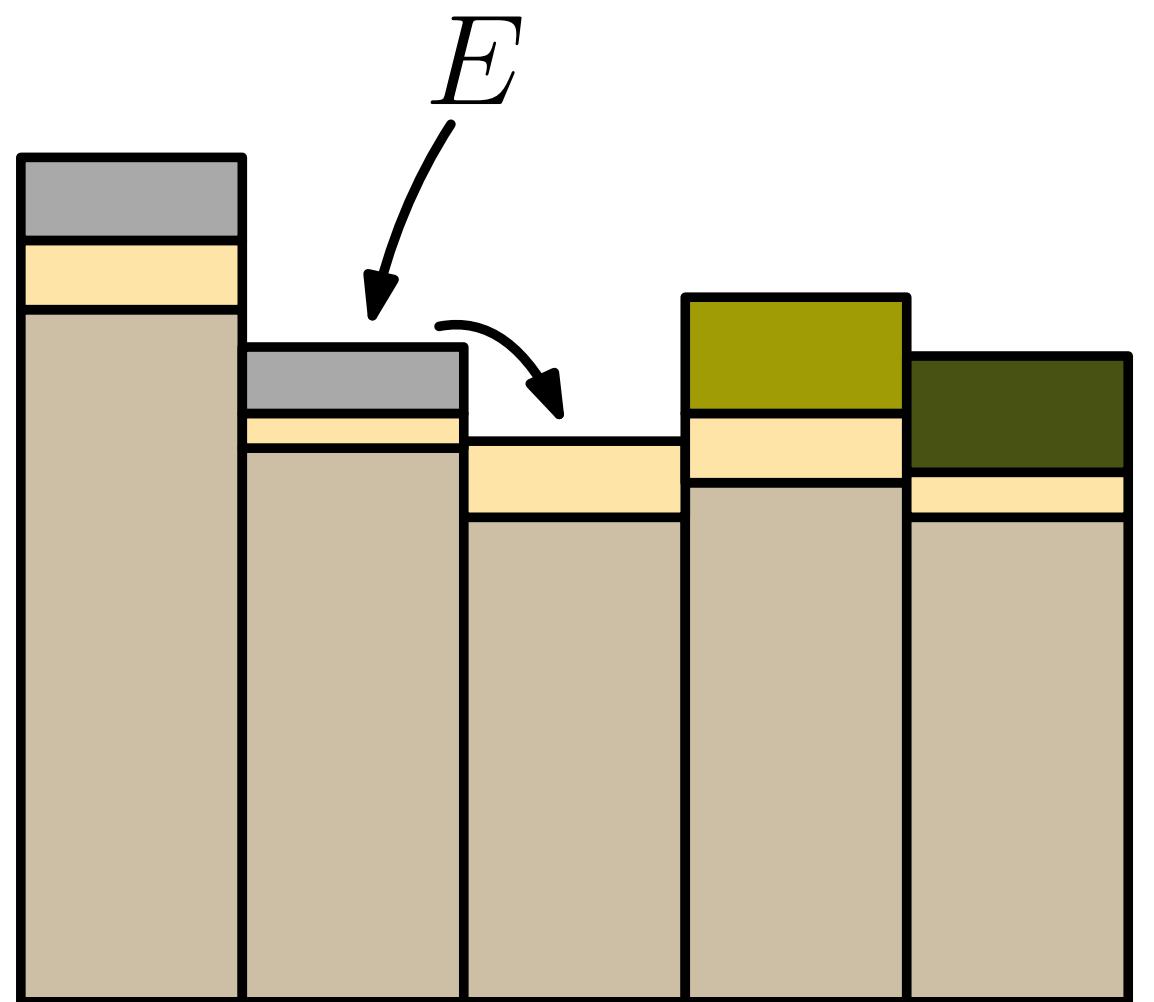


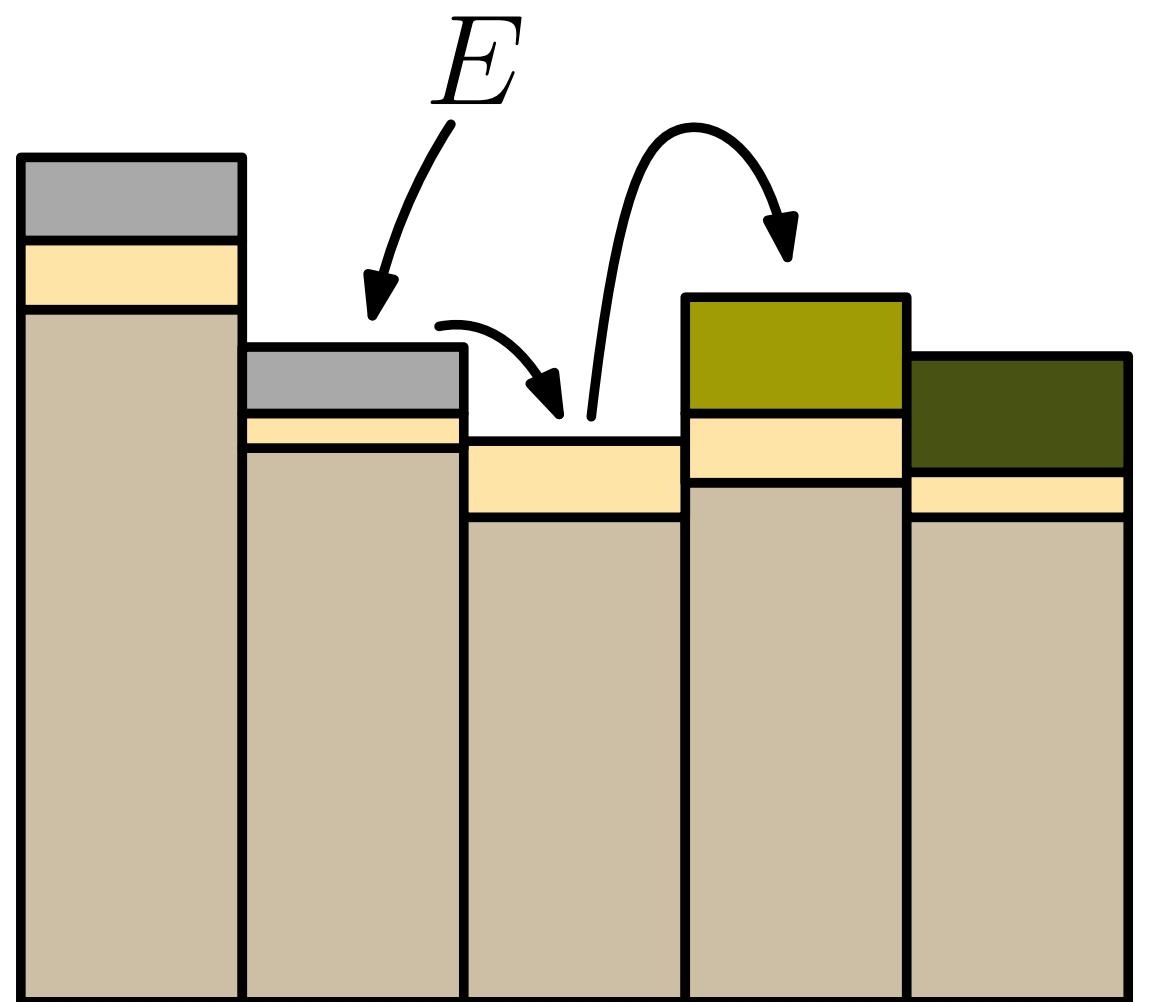


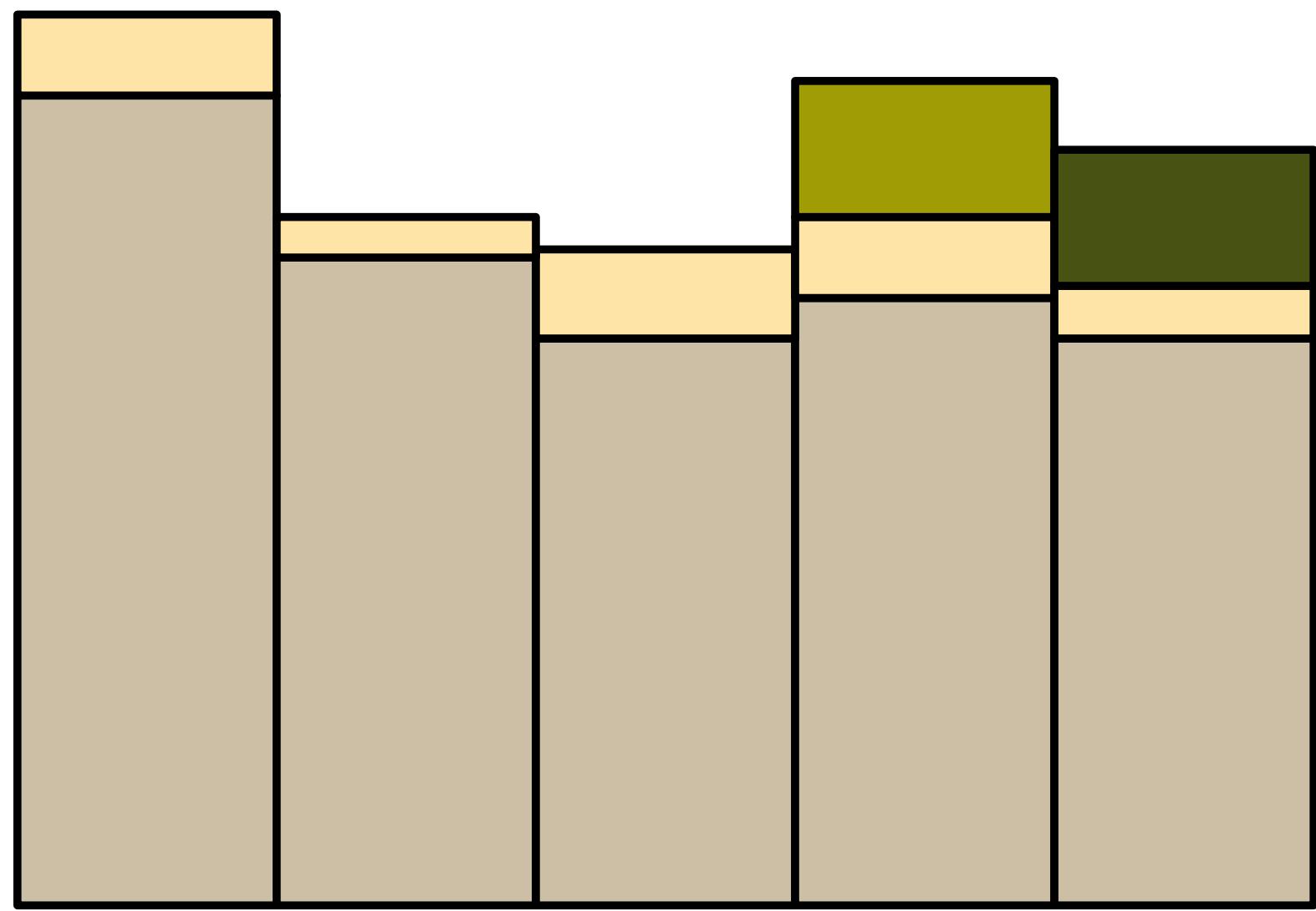


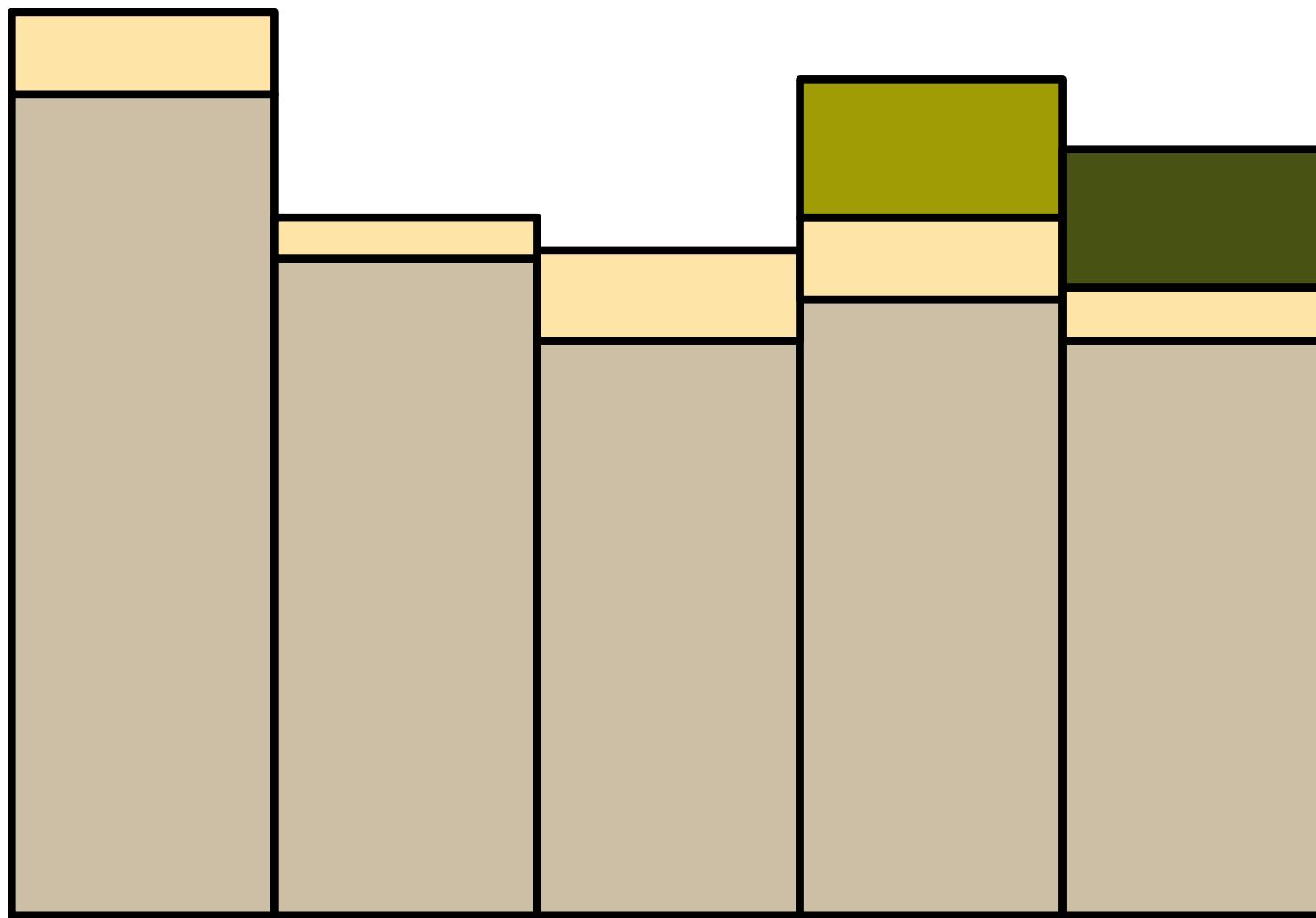
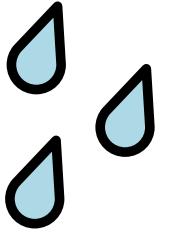


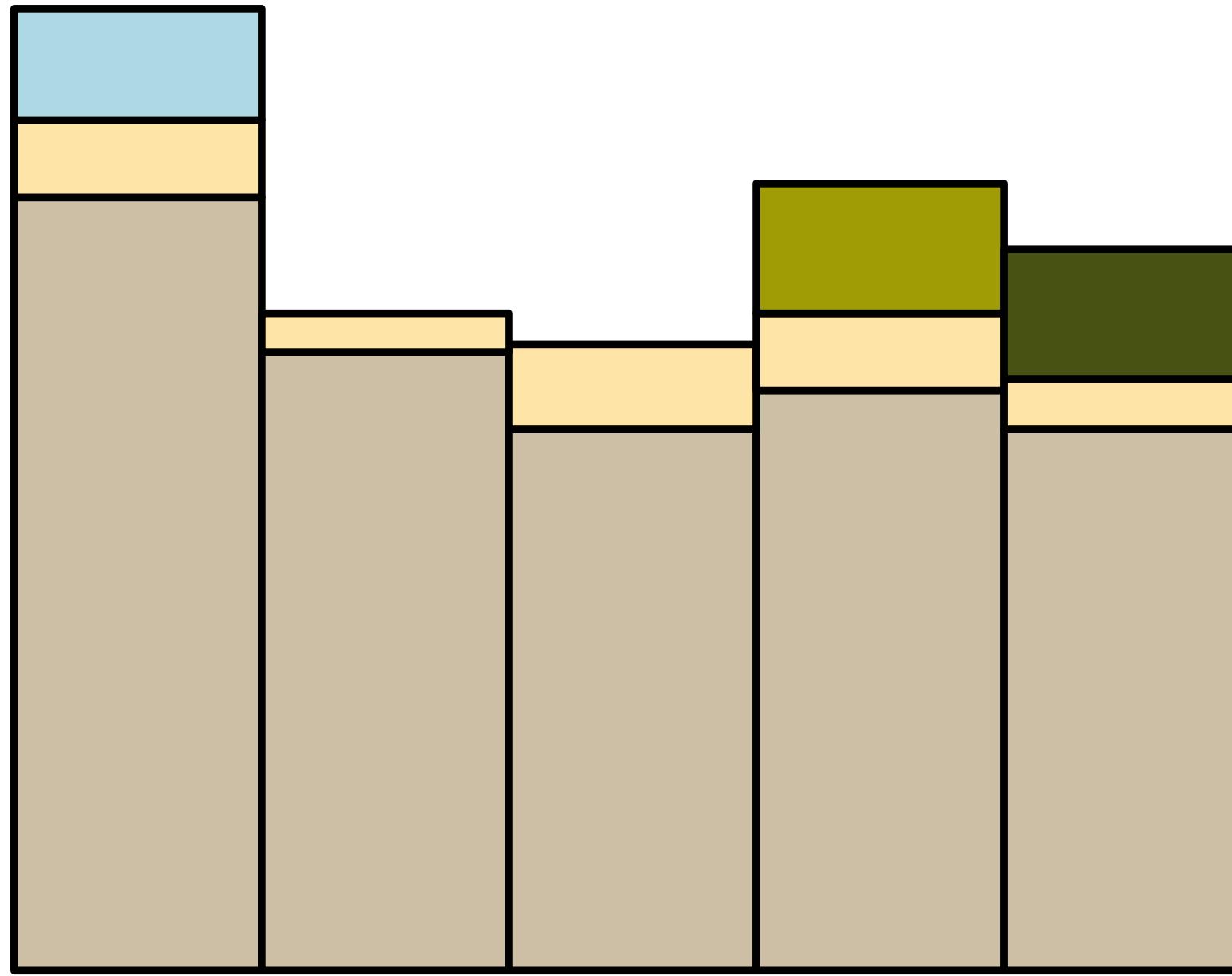


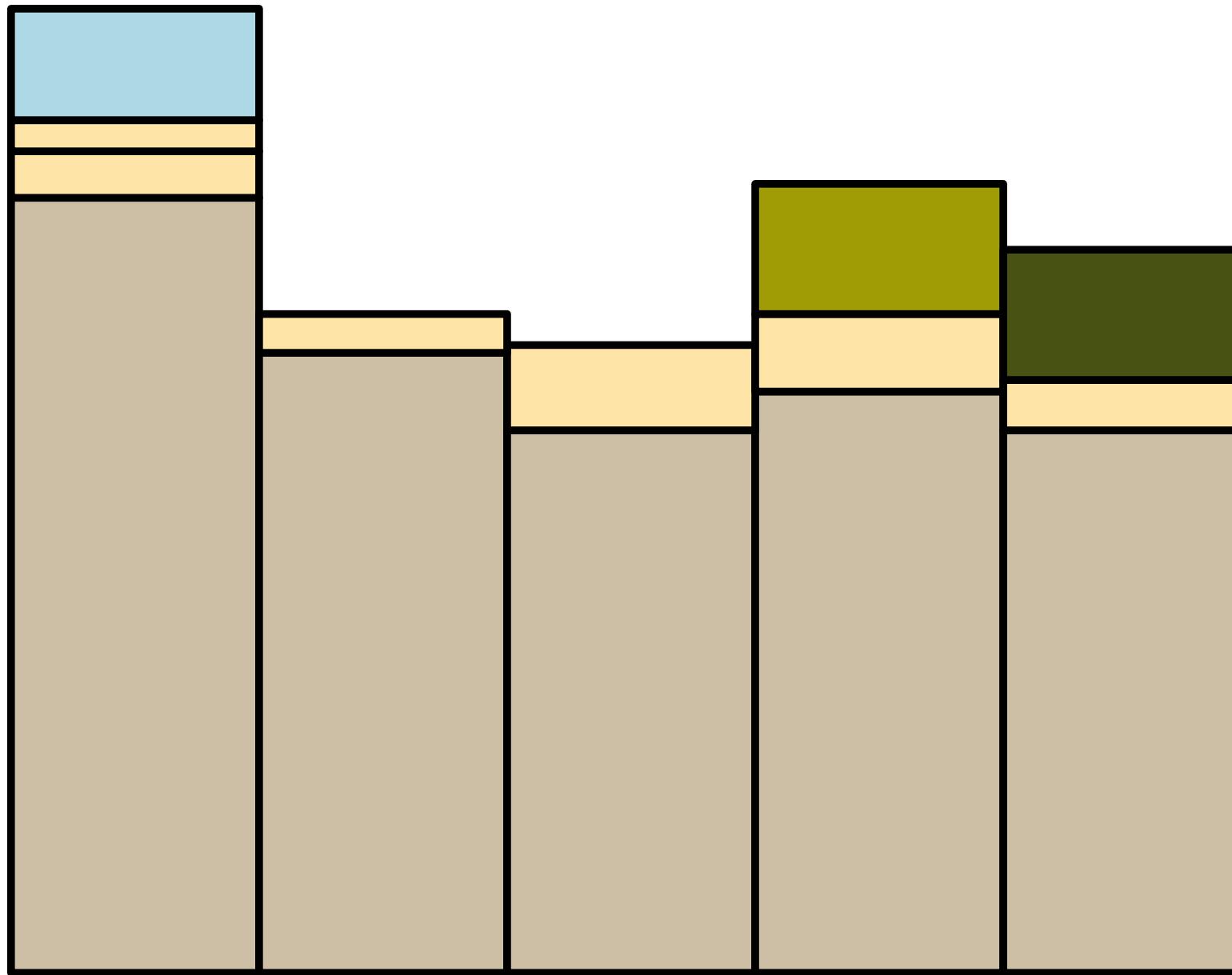


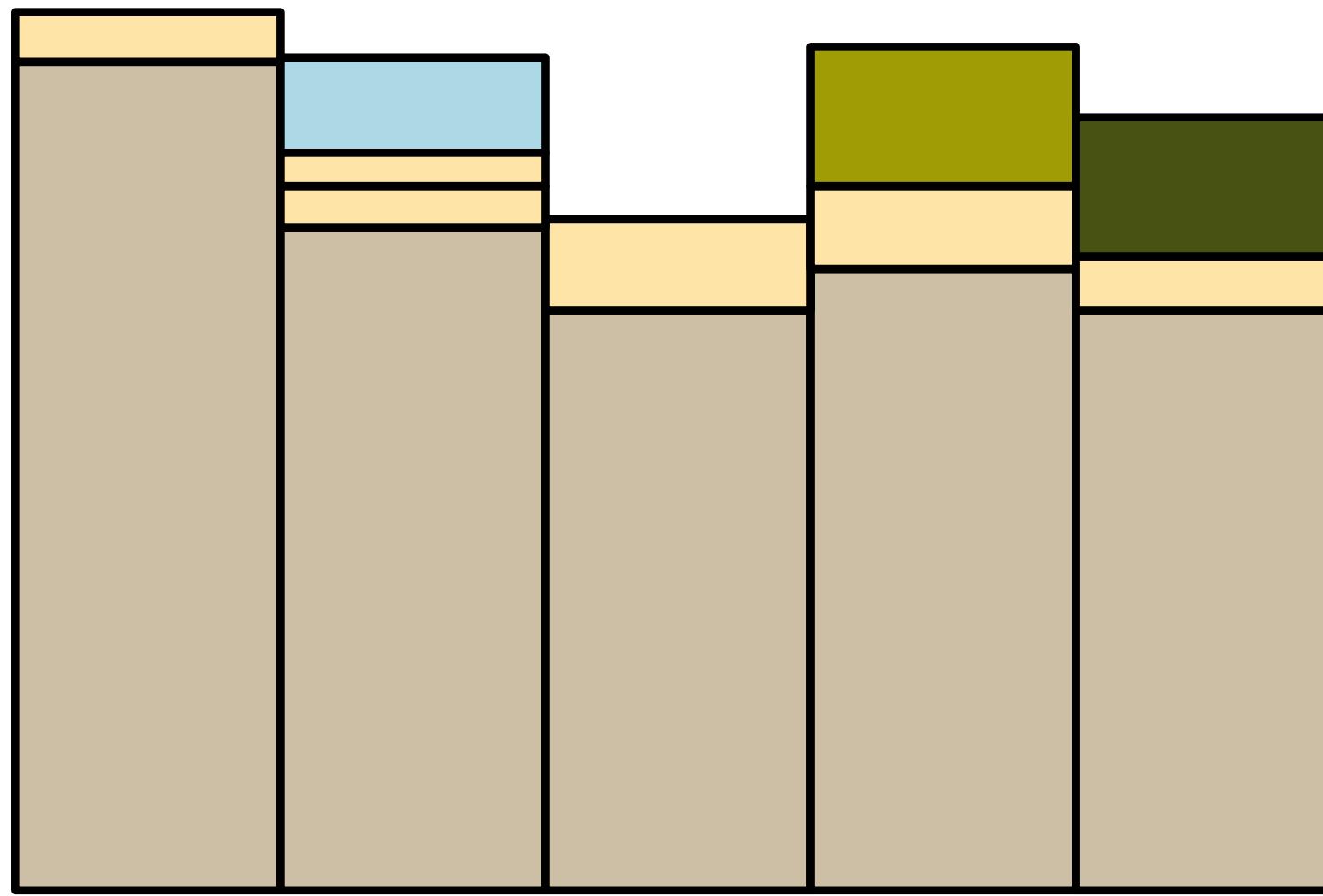


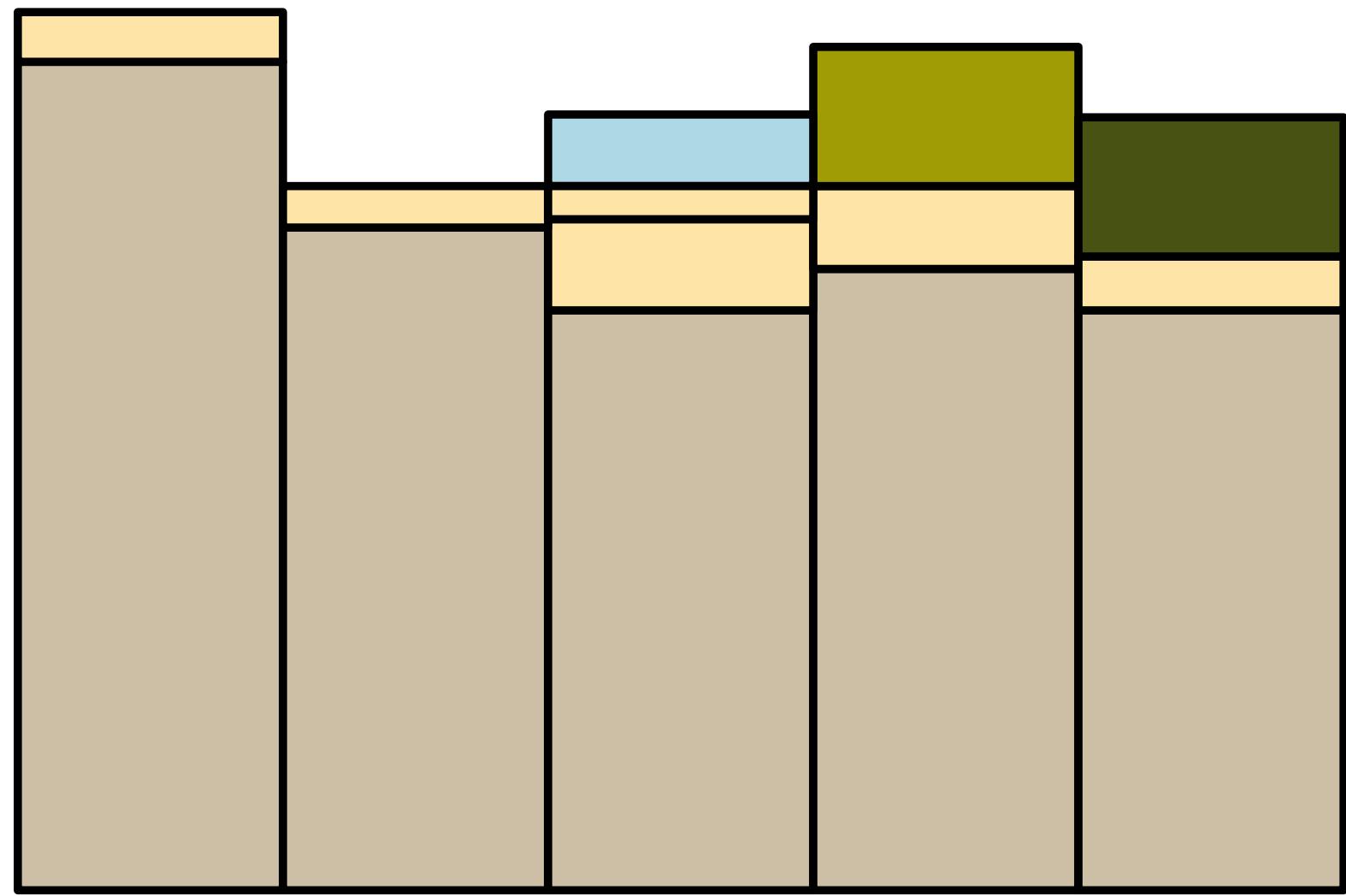


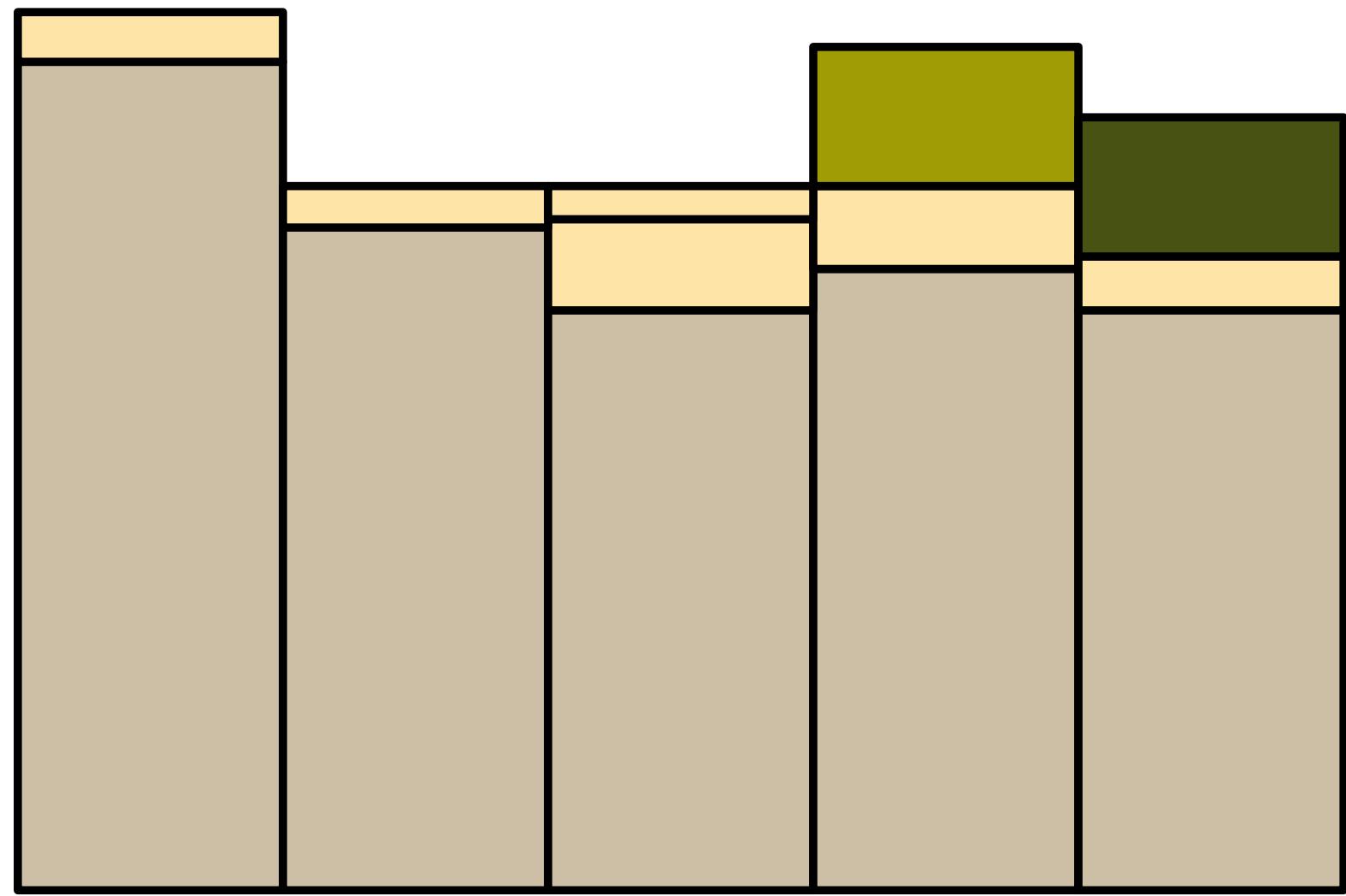


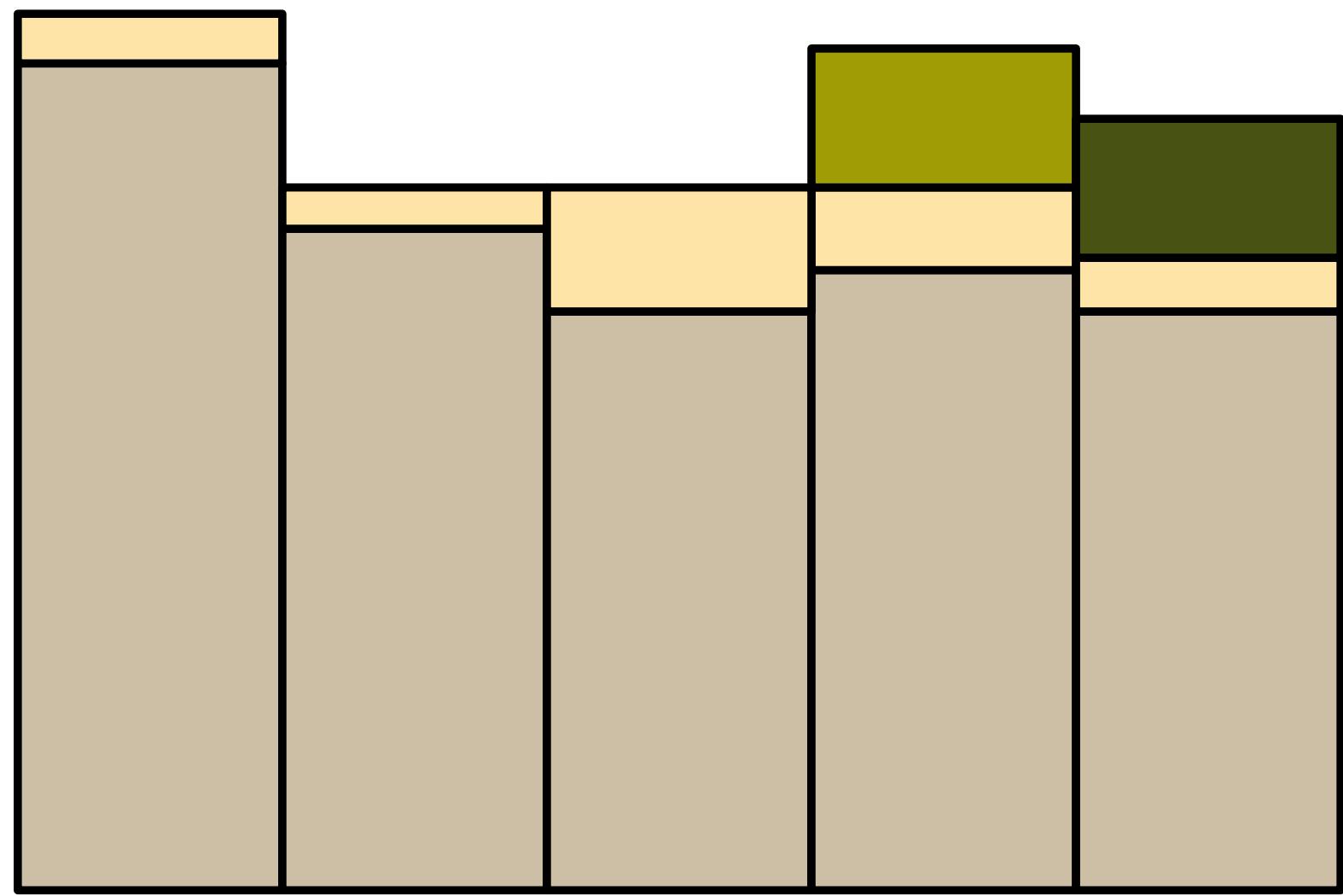


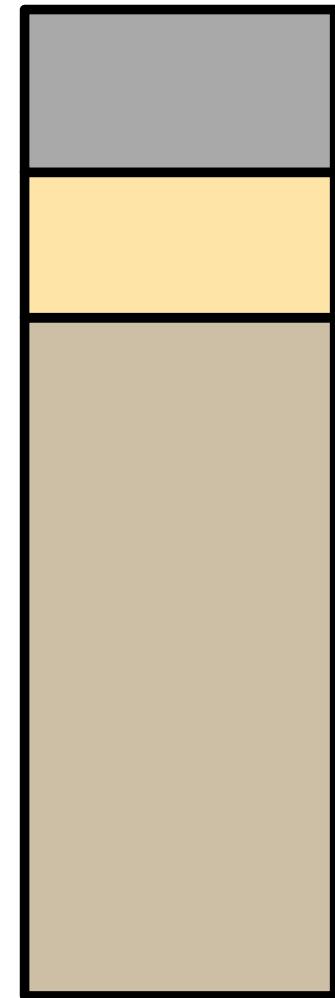


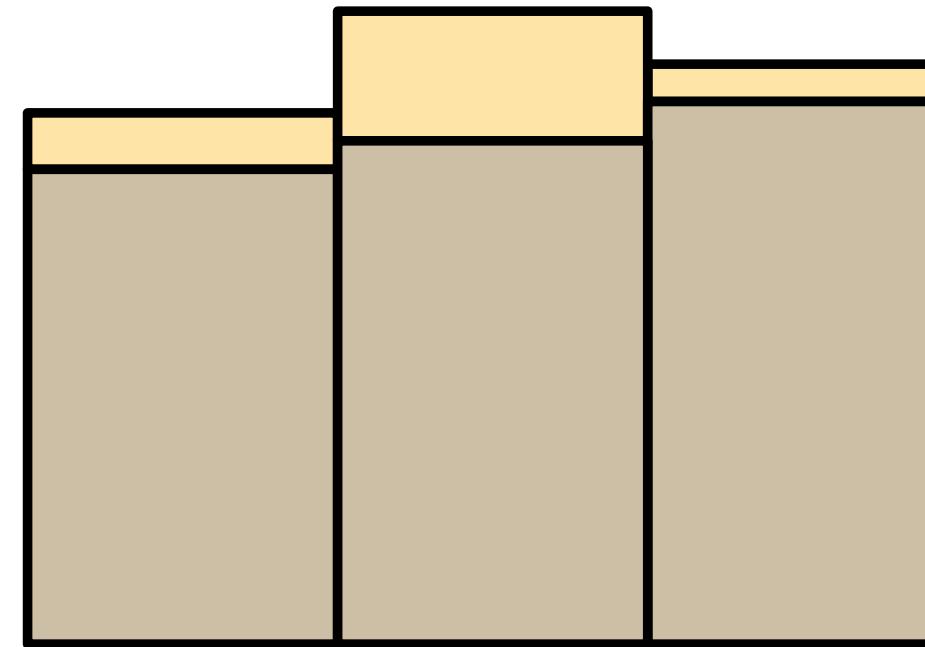
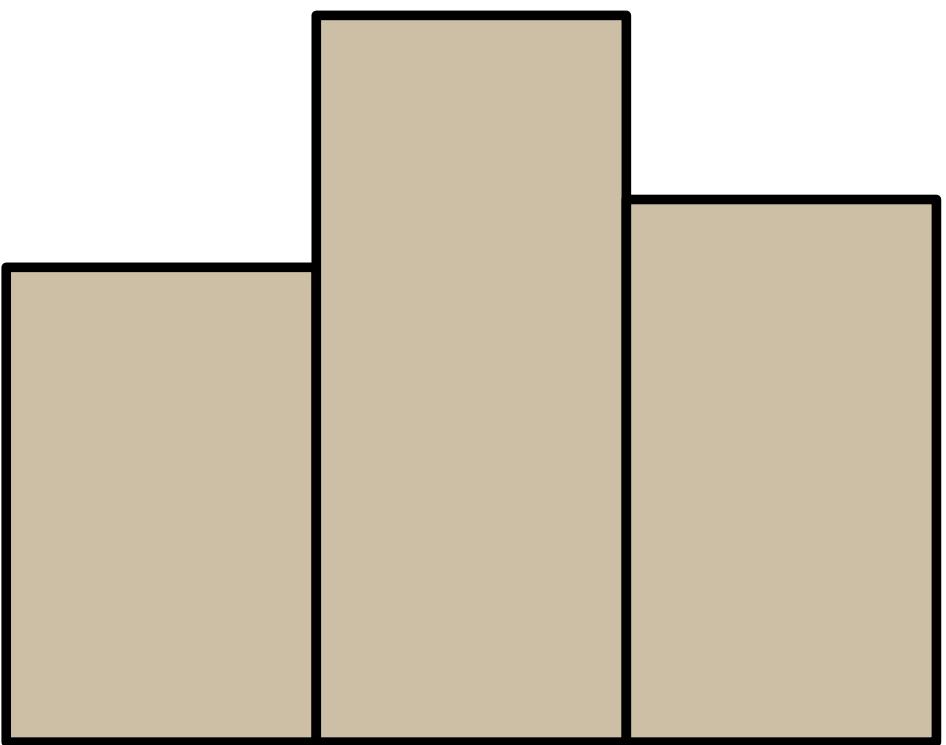




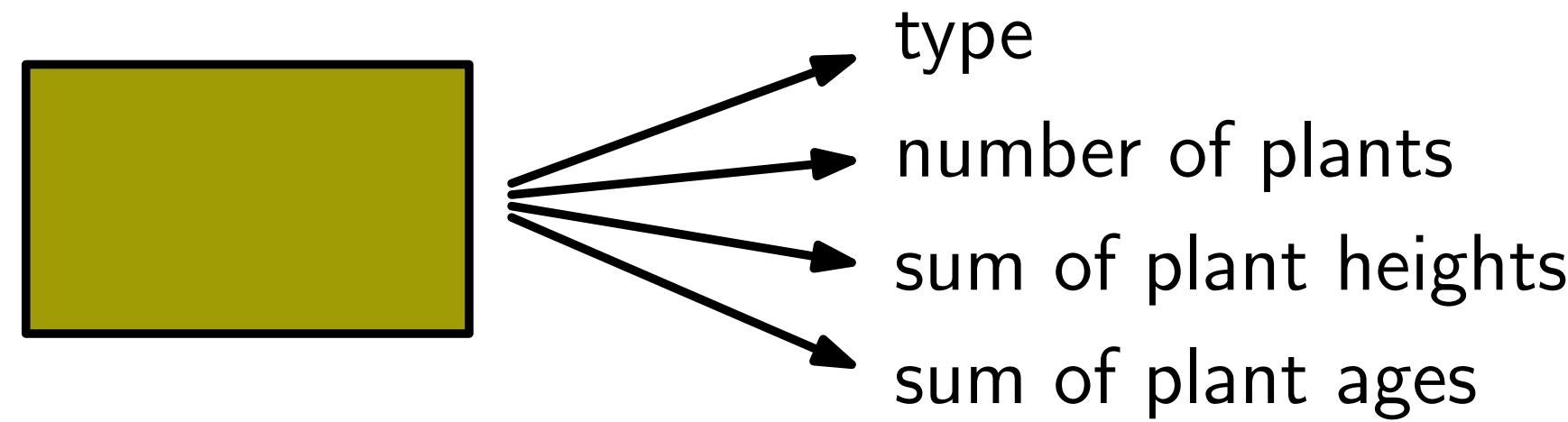


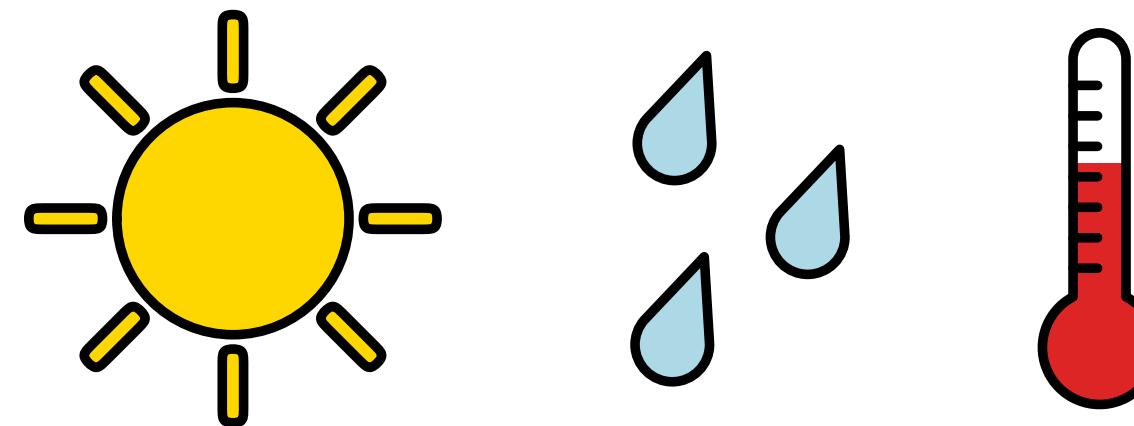
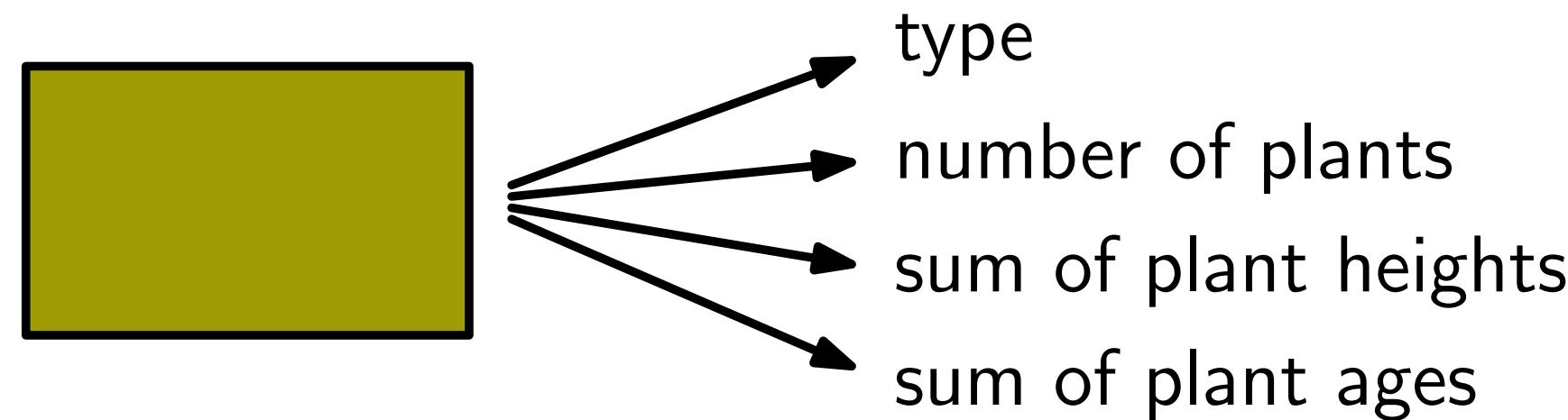


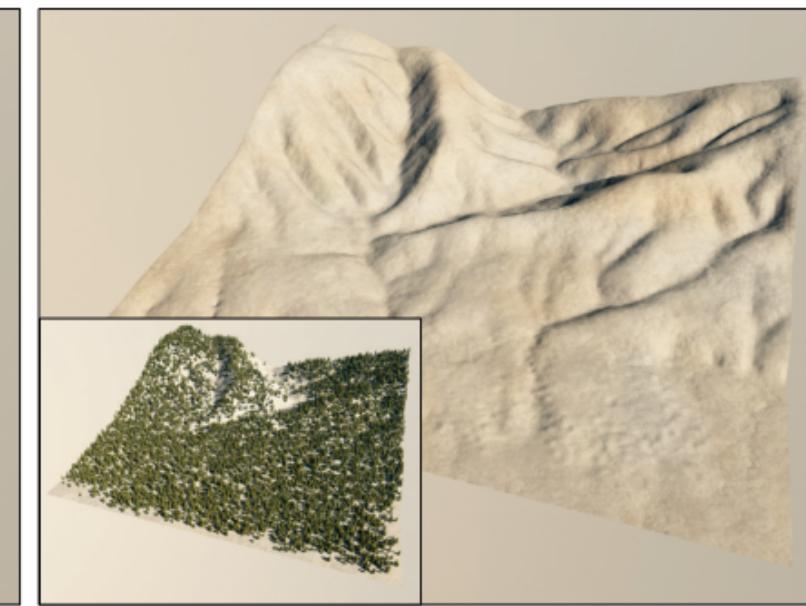
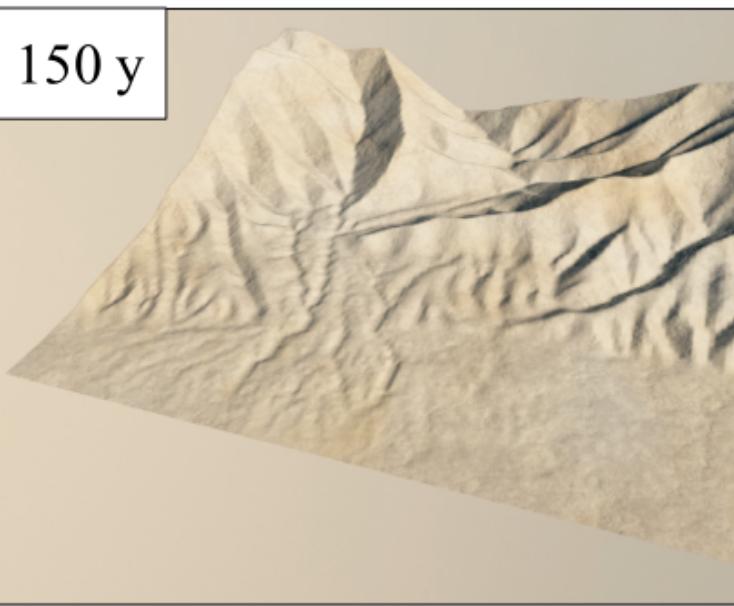
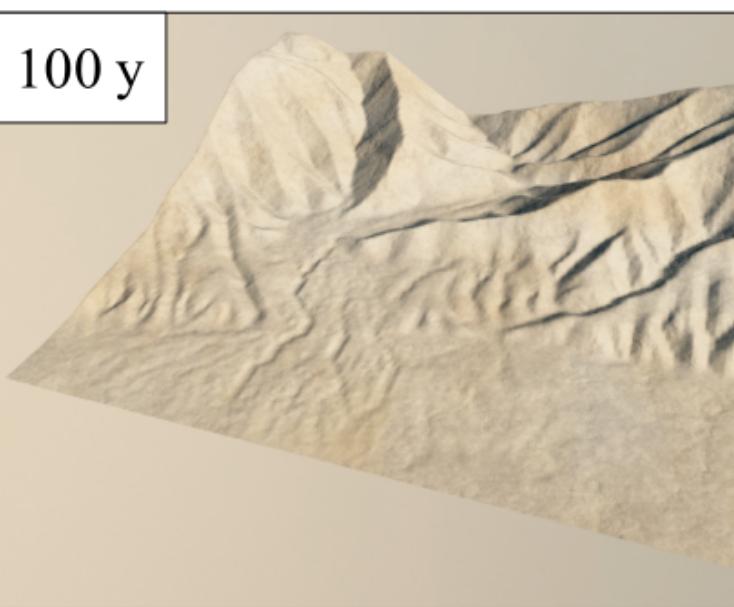


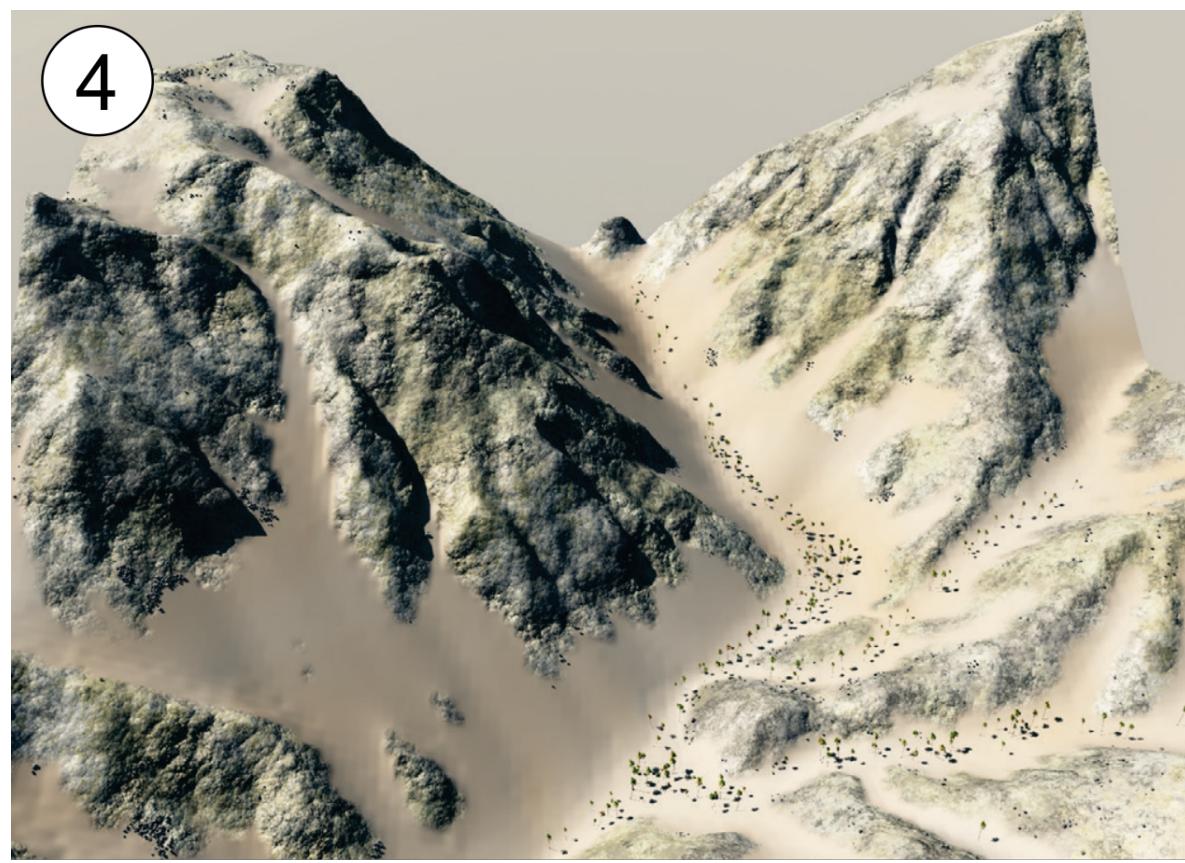
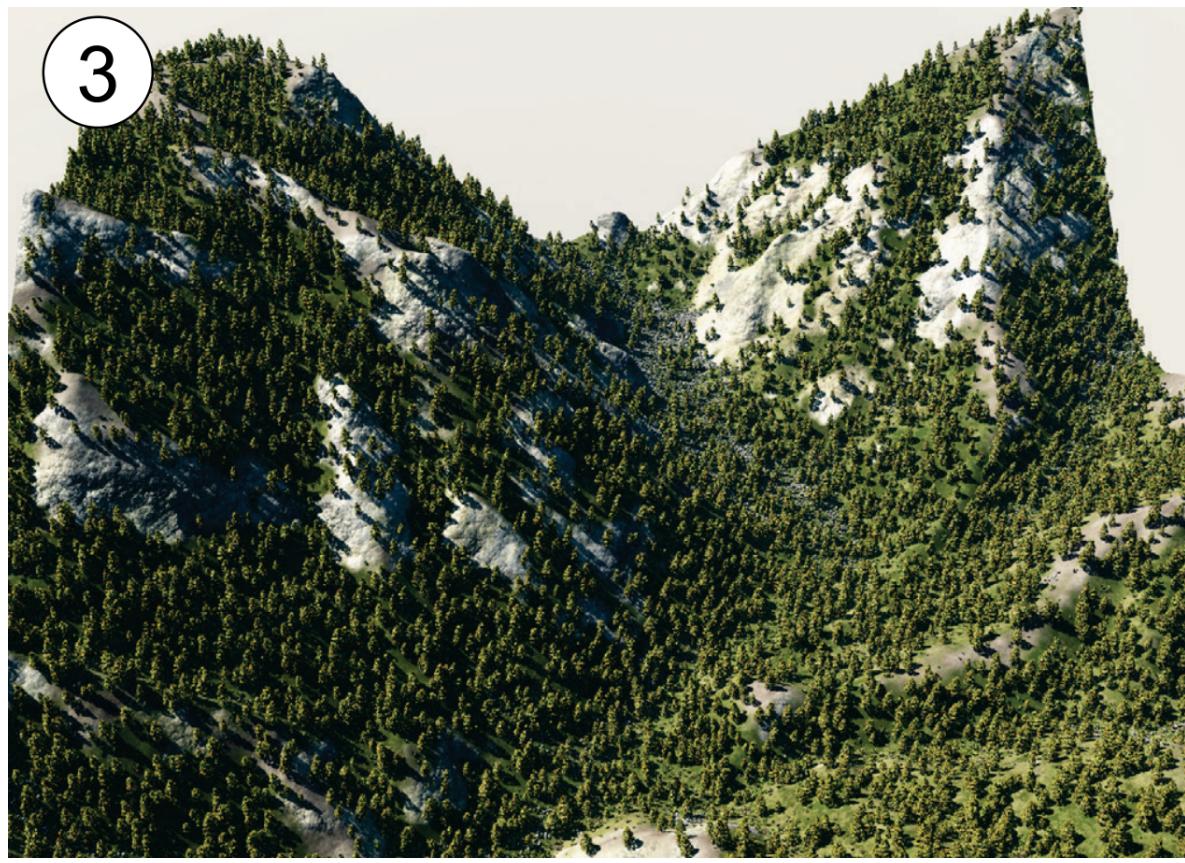
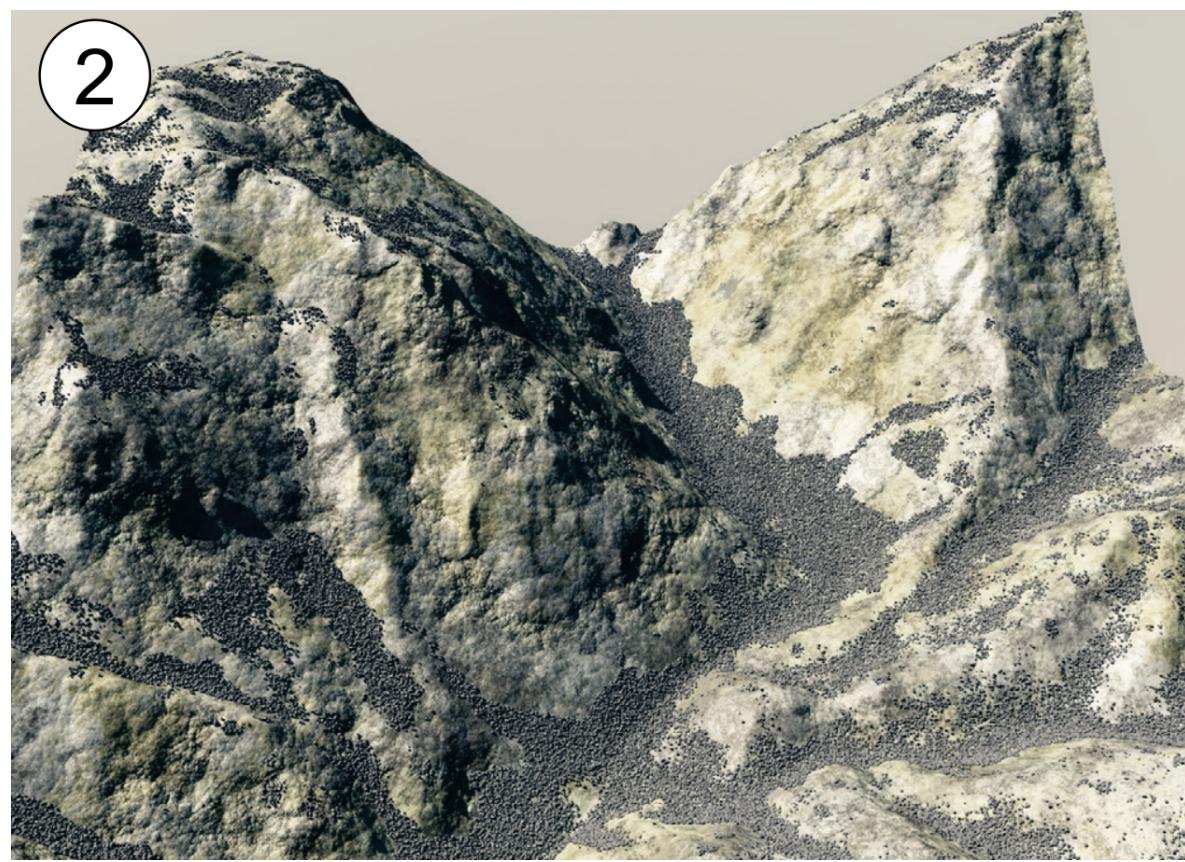












# Assignment 4

This method simulates the interaction between an ecosystem of plants and the terrain.  
Name three other things a terrain might interact with that could also be modelled in the same framework.