Raster GIS capabilities

Raster data

a	a	a	a	a	a	b	b	b	b	b
a	a	a	a	a	a	b	b	b	b	b
a	a	a	a	a	b	b	b	b	b	b
a	a	a	a	b	b	b	b	b	b	b
a	a	a	c	c	c	b	b	b	b	b
a	a	c	c	c	c	c	c	b	b	b
c	c	c	c	c	c	c	c	c	b	b
c	c	c	c	c	c	c	c	c	c	b
c	c	c	c	c	c	c	c	c	c	c

Raster data

- easier data structure
- certain analysis operations are more easily implemented
- good for representing continuous variation

Data input

- **allow import/export from/to:**

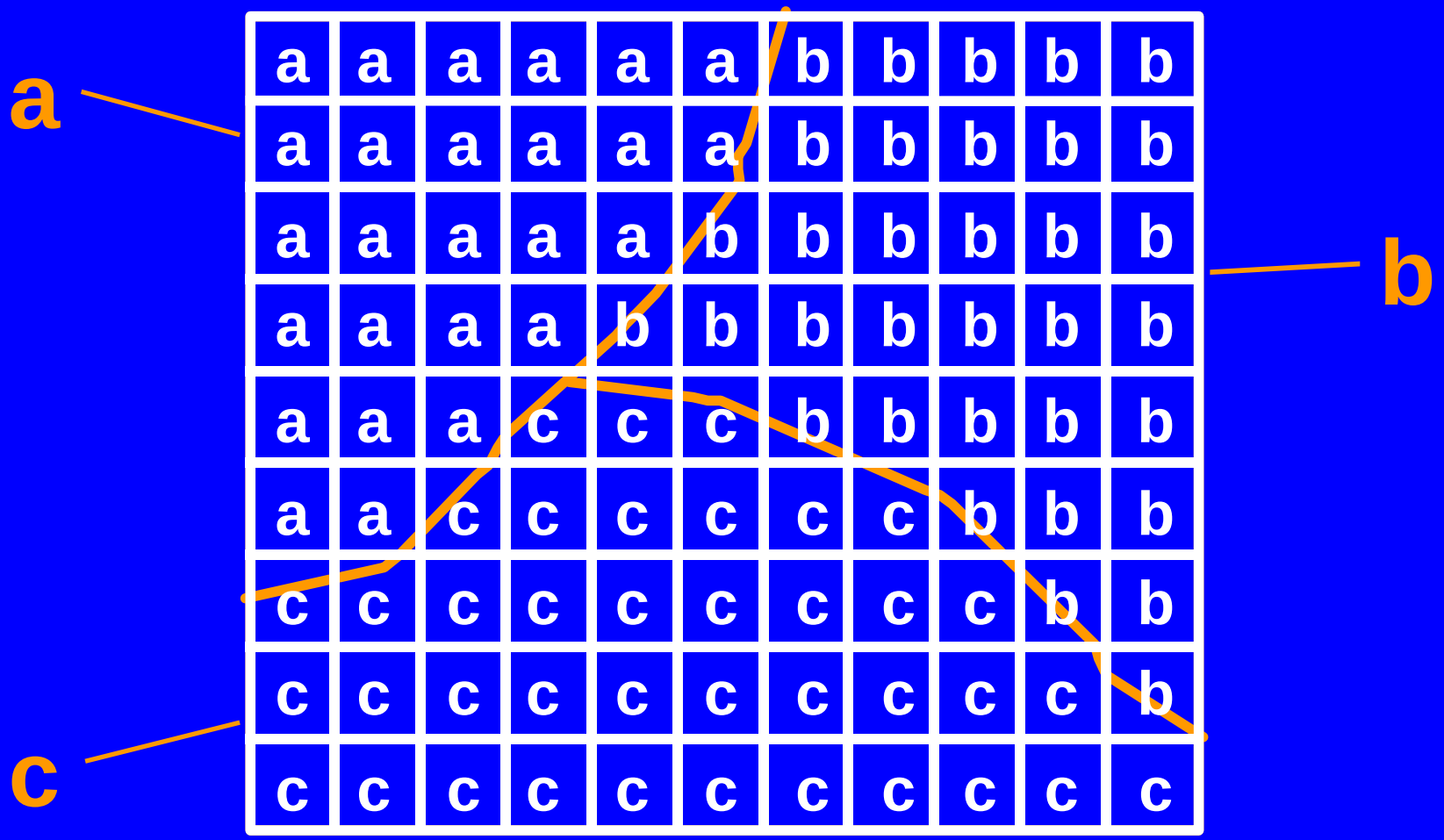
  - other raster GIS systems

  - image processing systems for remote sensing data (e.g., Erdas)

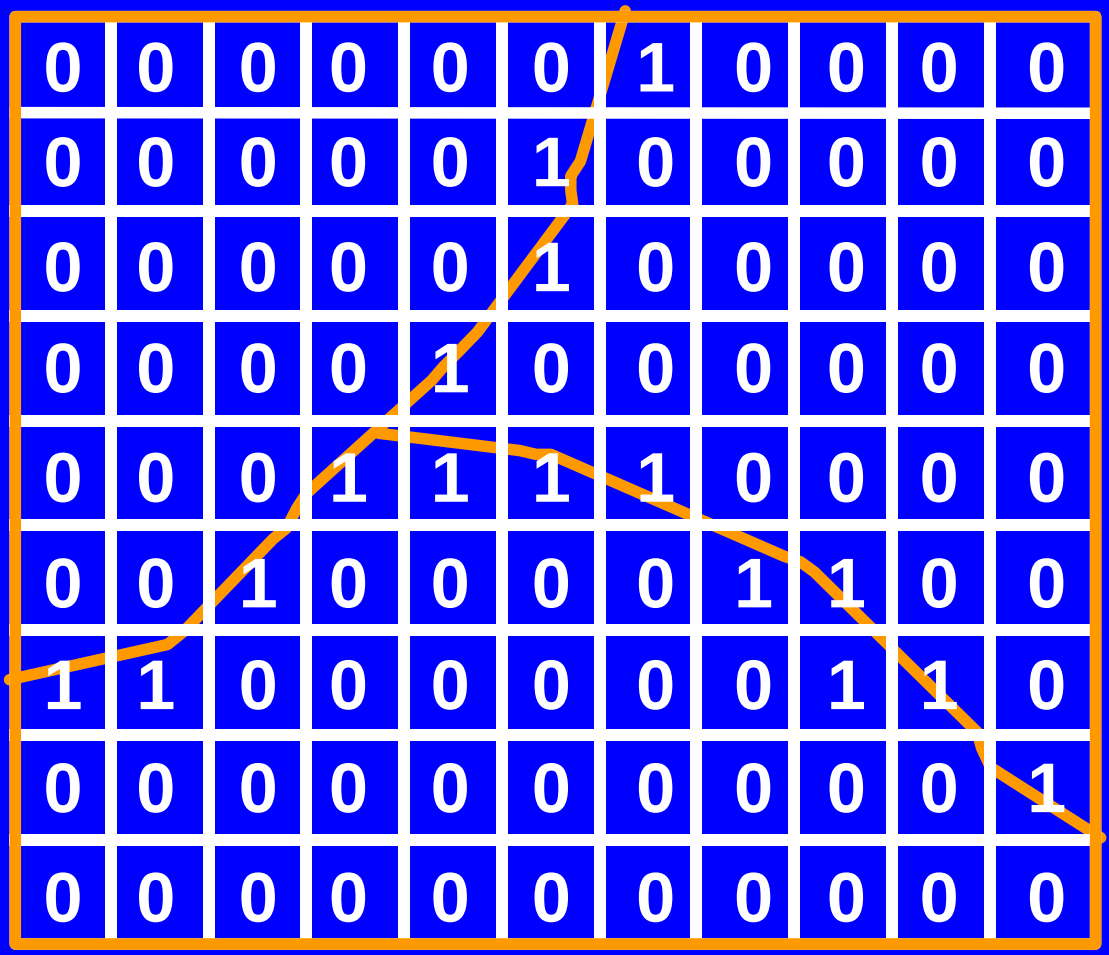
  - standard graphics formats (e.g. TIFF, GIF)

  - vector GIS systems (raster/vector conversion)

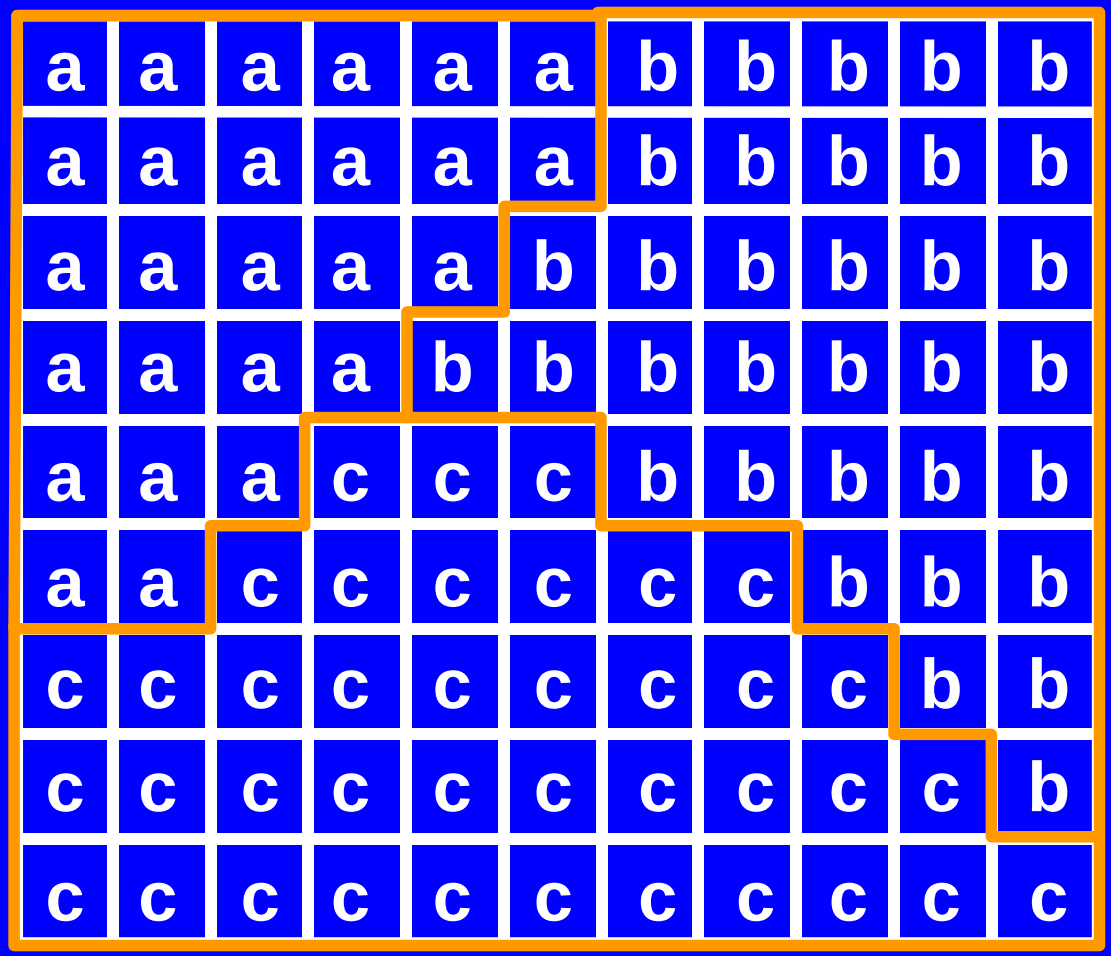
Vector to raster conversion polygons



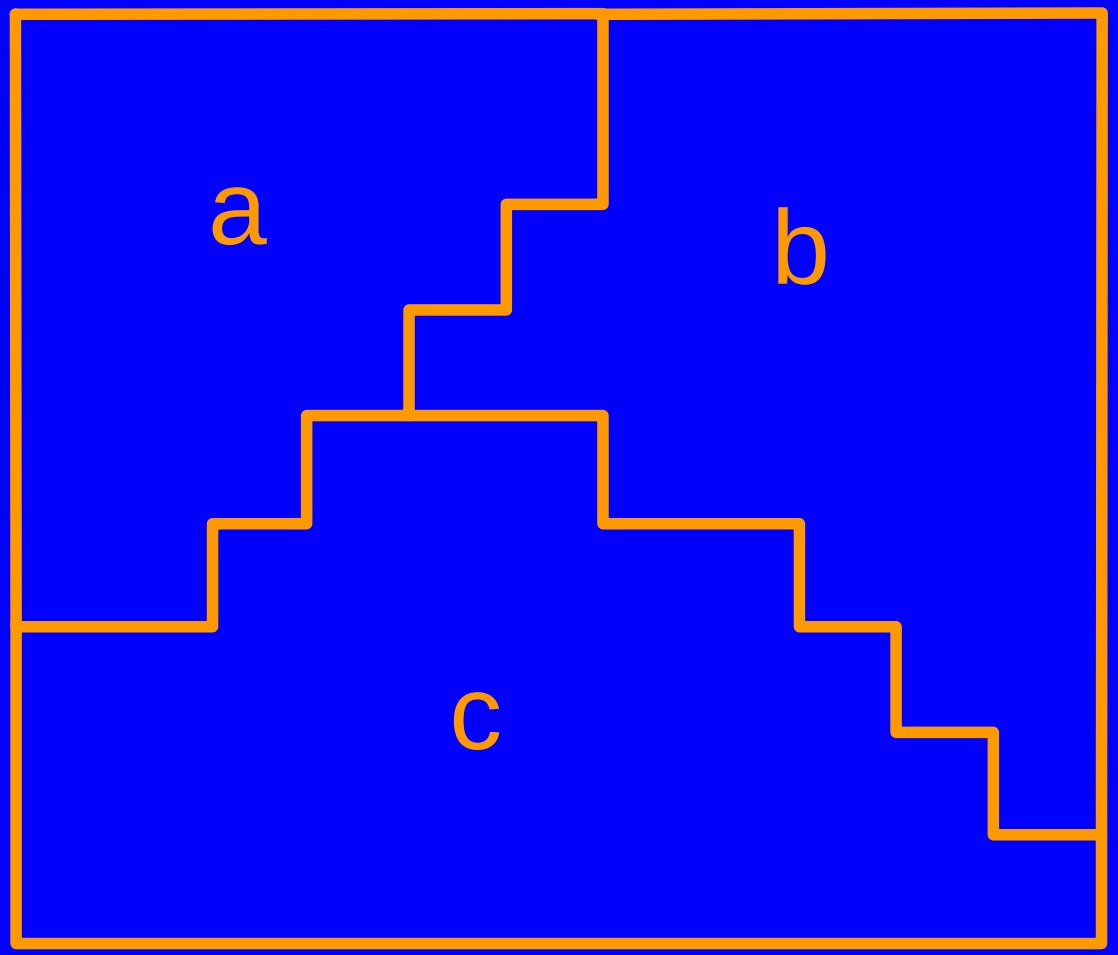
Vector to raster conversion lines



Raster to vector conversion polygons



Raster to vector conversion polygons



Operations on raster layers

Raster map overlay

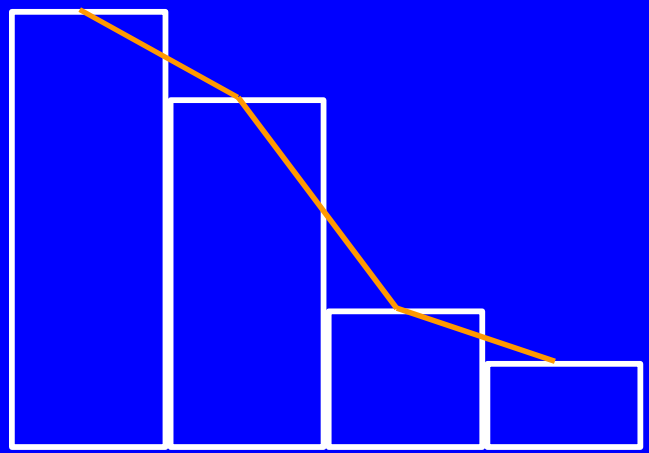
- output cell value is the result of an arithmetic operation on the input layers
- e.g., if a and b are input layers and c is an output layer,
  c = a + b
  c = a * b
  .....
- also any kind of function such as average, sum, min, max, std. dev.

Raster map overlay

- these operations are often termed **map algebra**
- important to consider measurement of input data layers; e.g., it makes no sense:
  - to divide soil class **a** by land use class **b**
  - or to add population density in layer **a** to the agroclimatic class in layer **b**

Operations on elevation data

- **slope**
  - **steepness of slope in elevation layer**
  - **computed by comparing cell elevation with neighboring values**
  - **measured as the angle from horizontal**



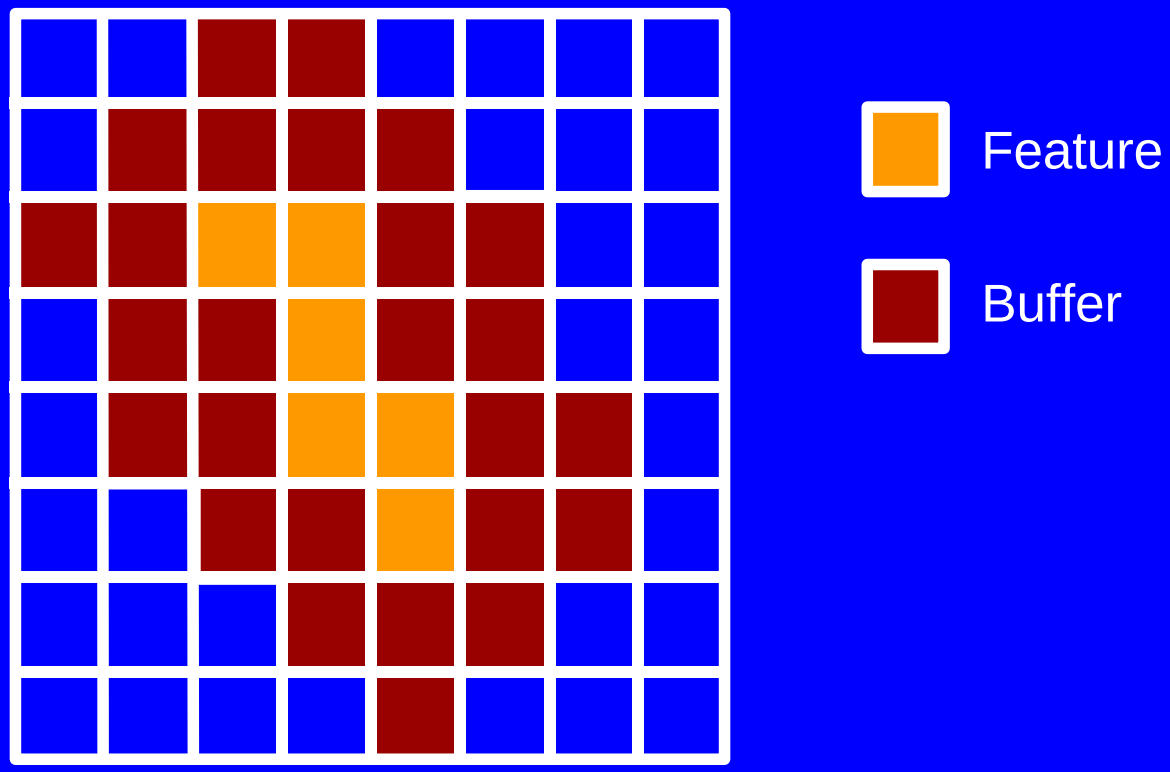
Distance

- output cell values are the distances from an originating cell or point

4	3	2	3	4	5
3	2	1	2	3	4
2	1	0	1	2	3
3	2	1	2	3	4
4	3	2	3	4	5
5	4	3	4	5	6

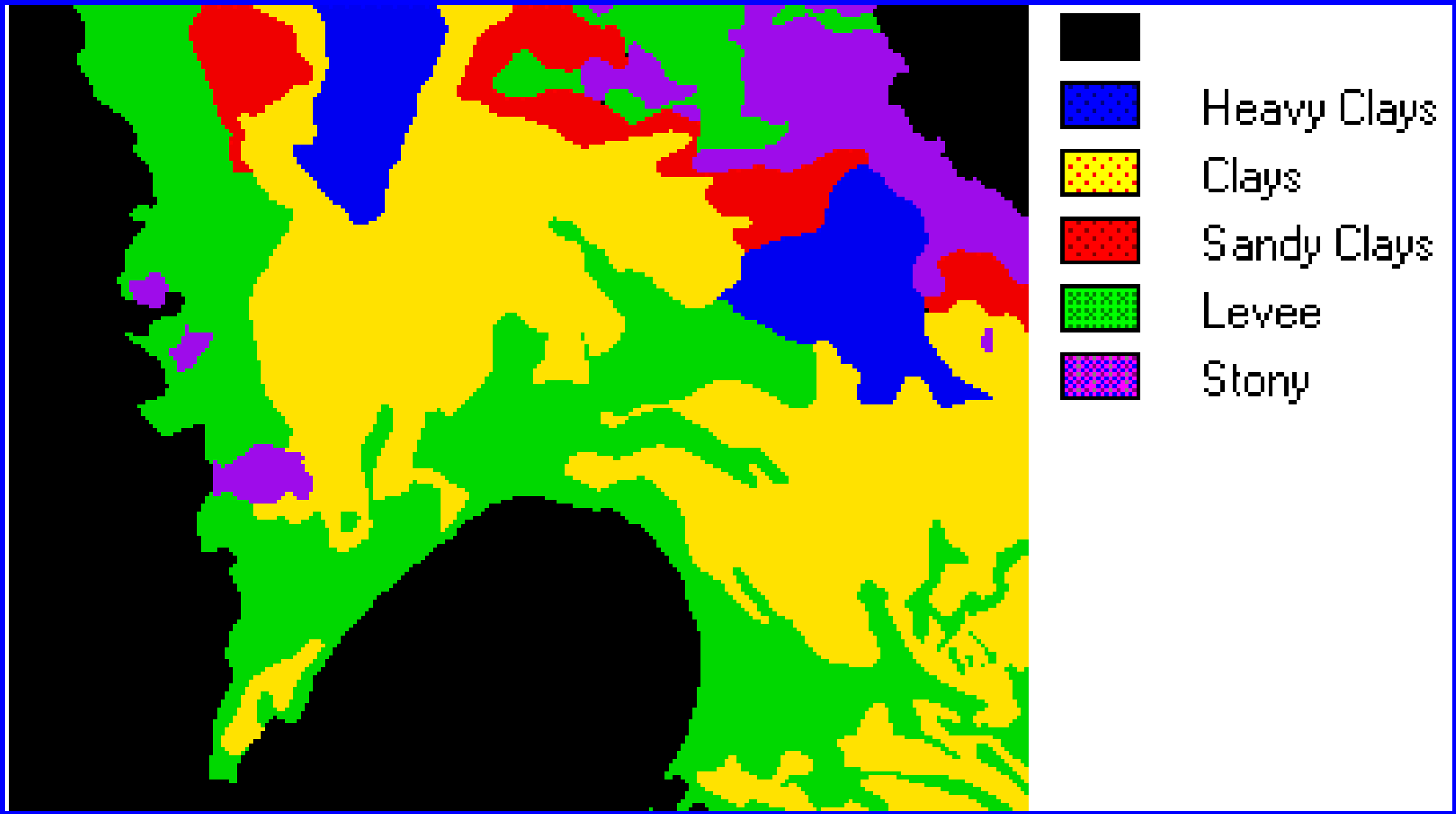
Buffer

- can be thought of as spreading a feature by a given distance

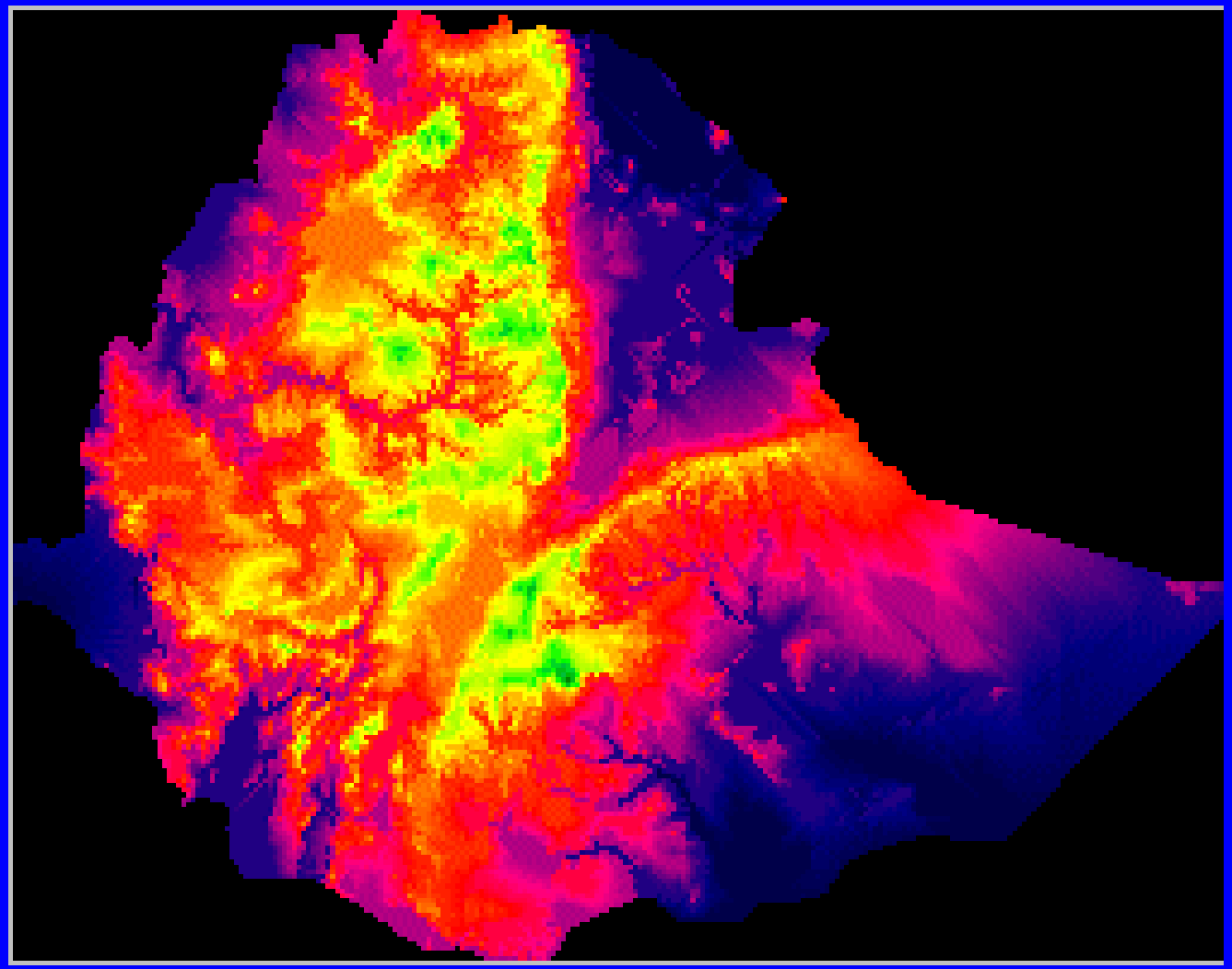


Visualization of raster data

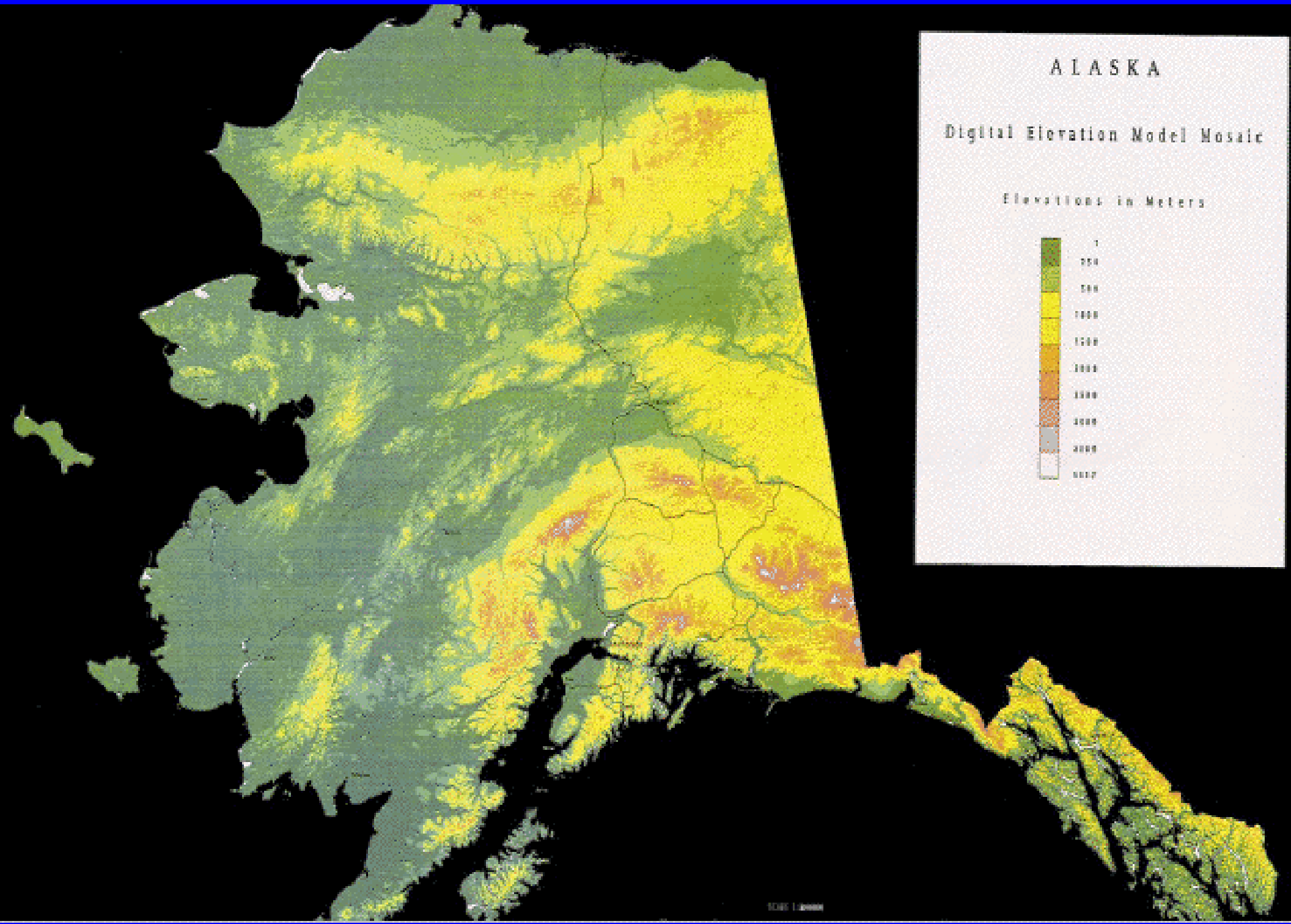
Categorical data



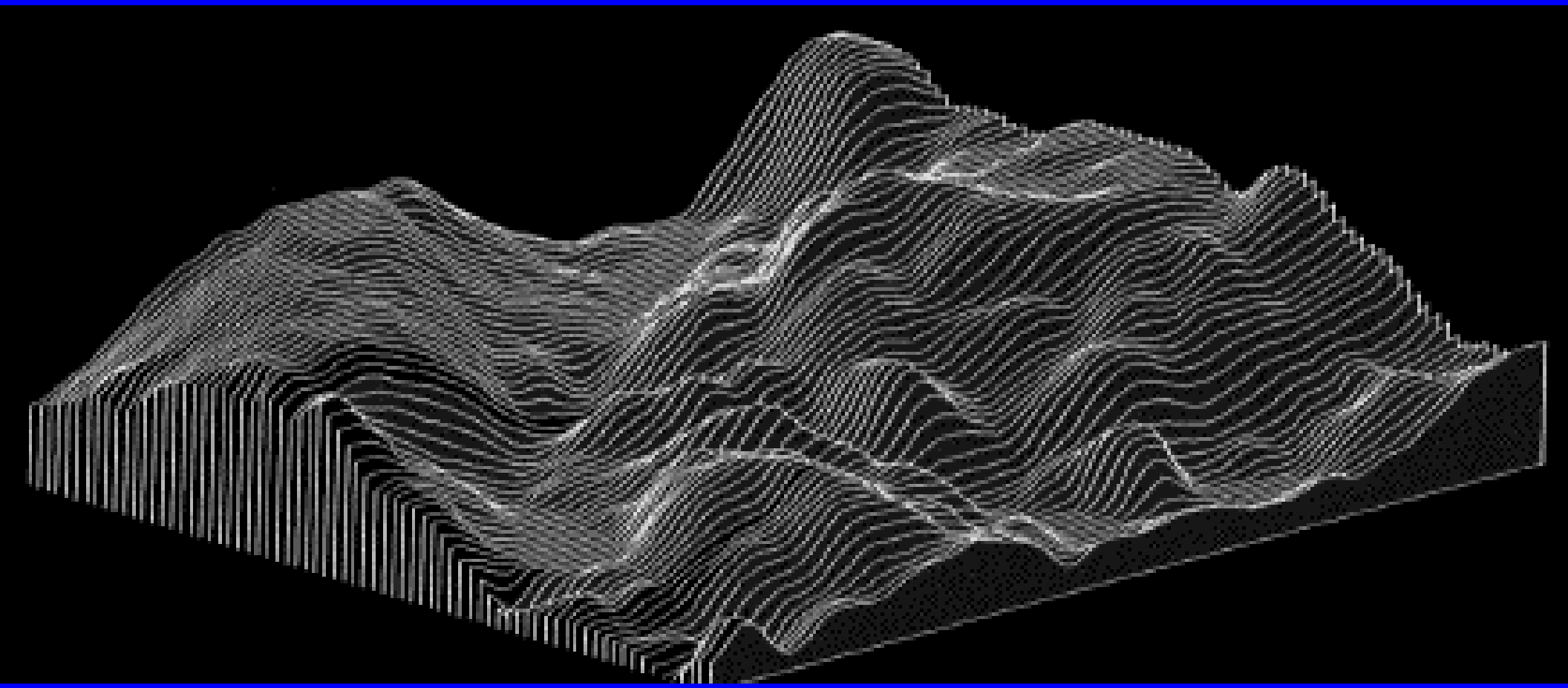
Continuous data



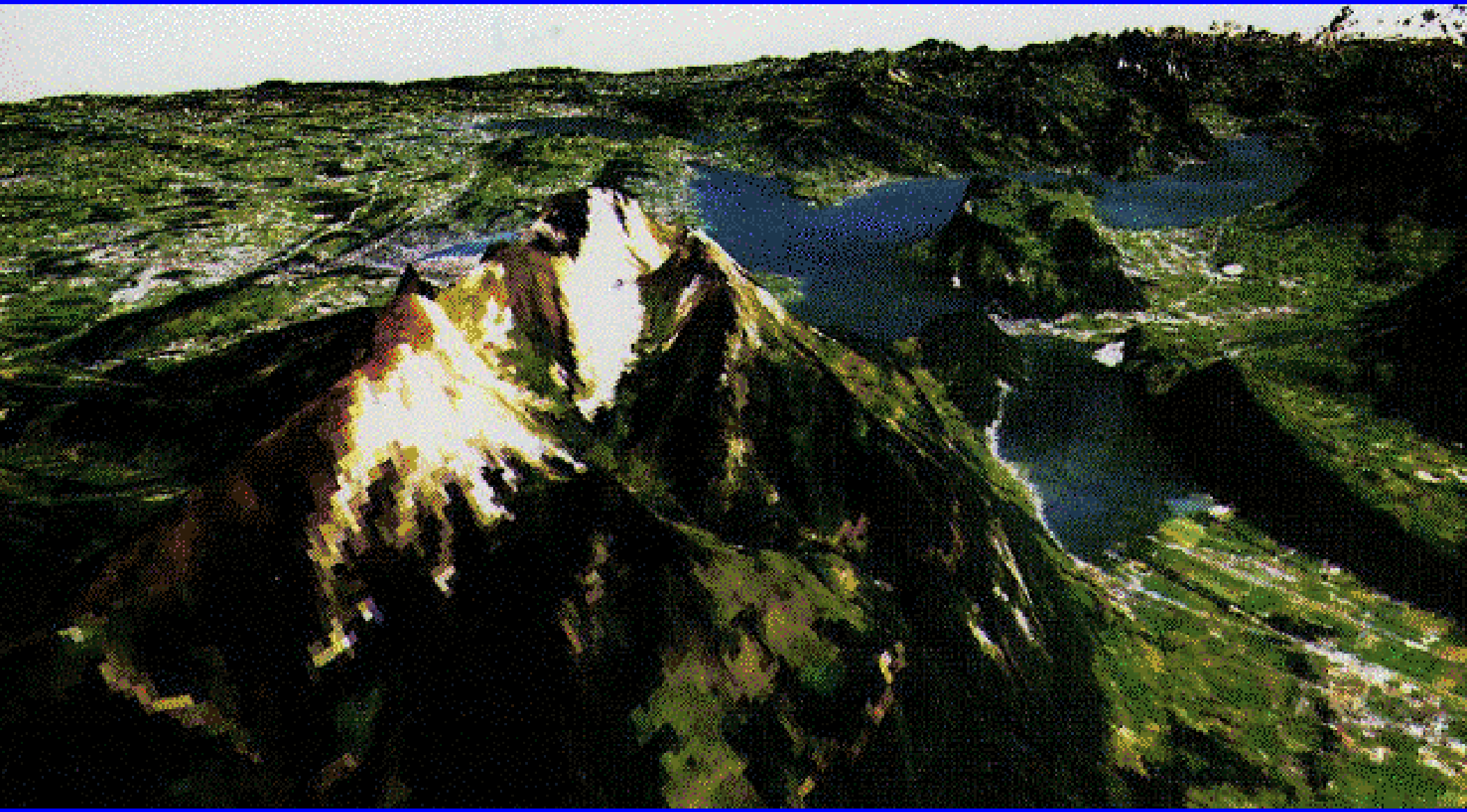
Ethiopia - Elevation


ALASKA
Digital Elevation Model Mosaic
Elevations in Meters

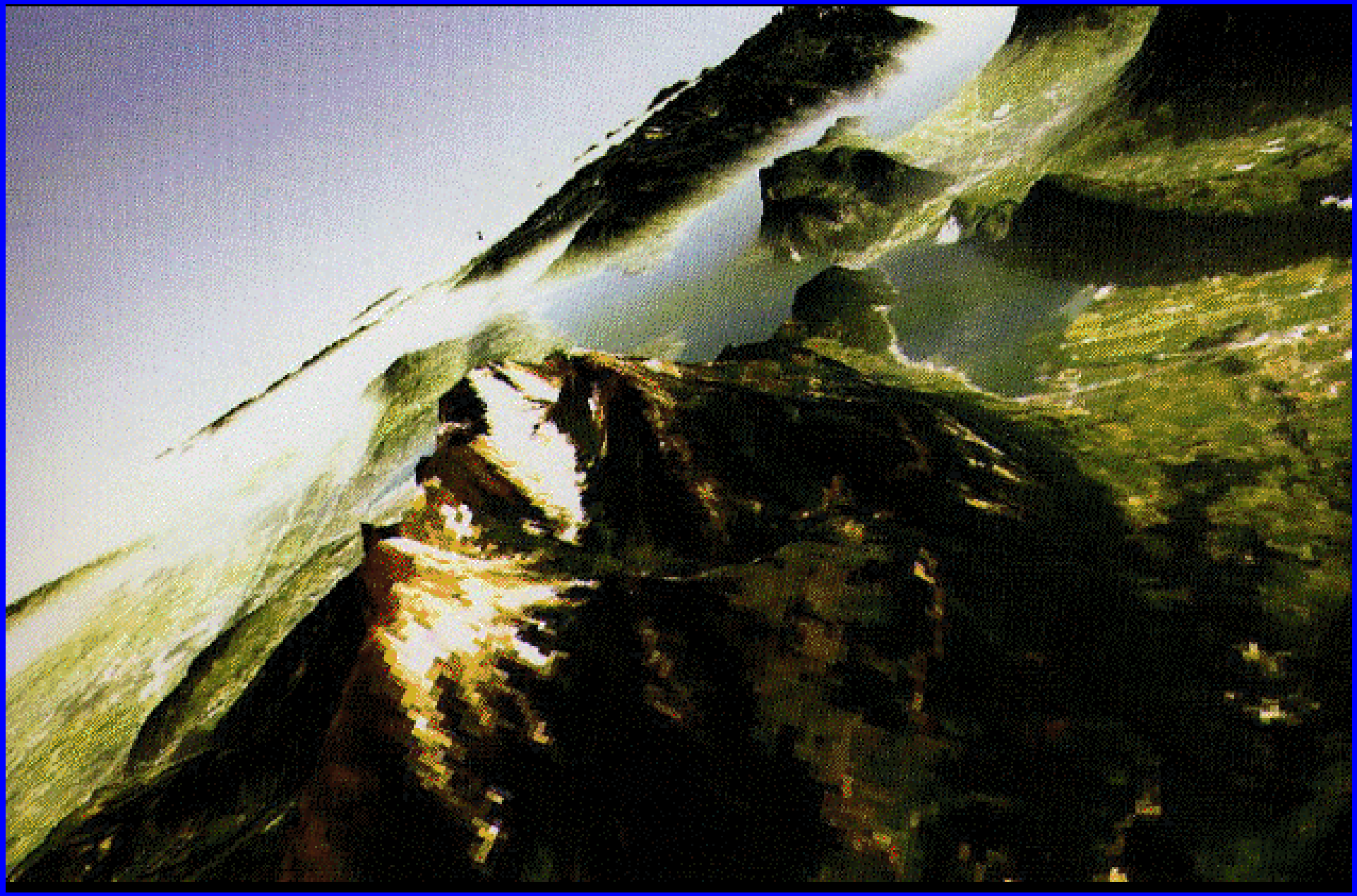
Orthographic perspective view derived from a continuous raster data set

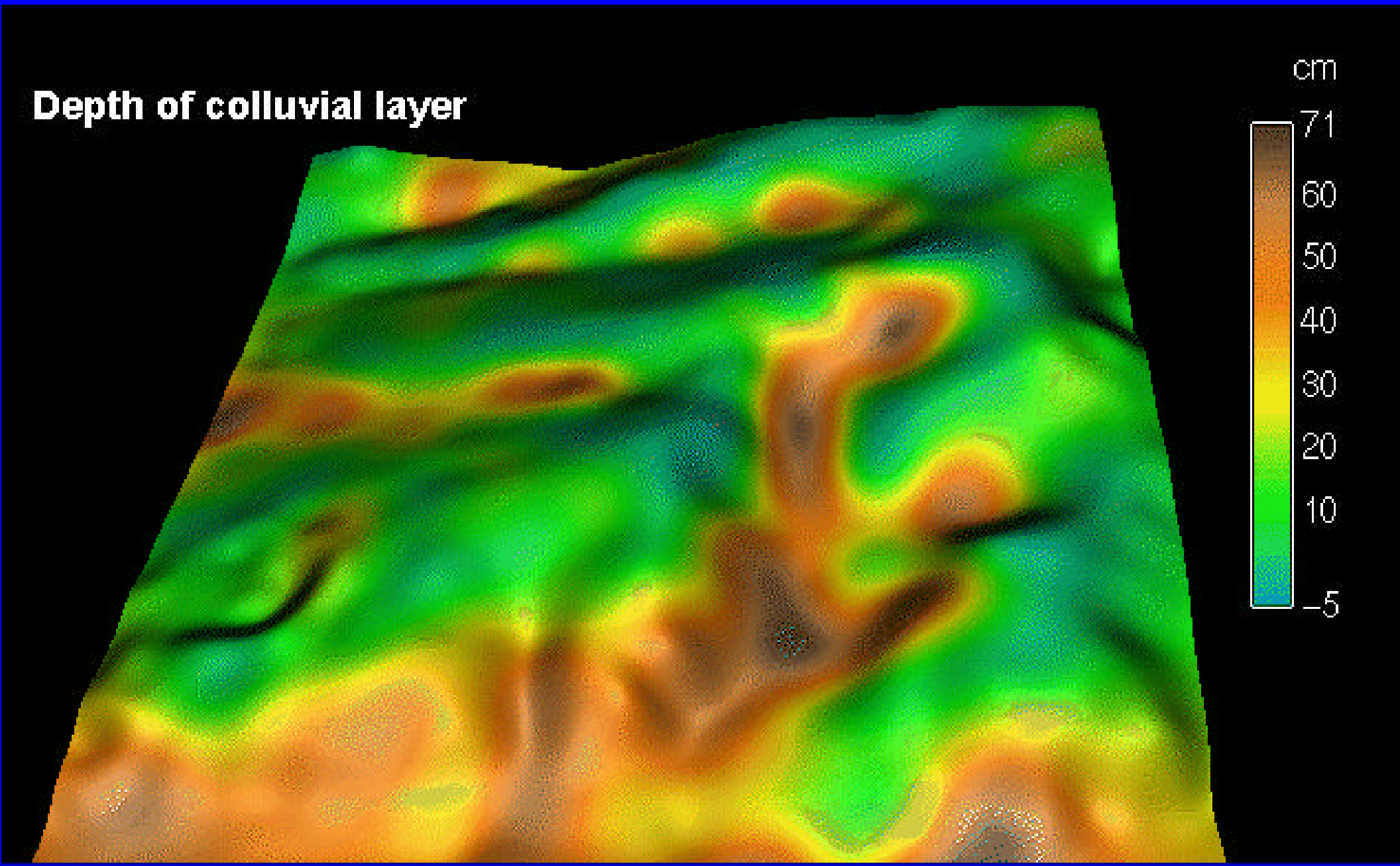


Landsat image draped over a DEM



Landsat image draped over a DEM




Depth of colluvial layer
cm
71
60
50
40
30
20
10
−5