Description of master thesis

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Rapid modeling of geological structures

Geologist often make sketches of geological structures, both in order to communicate ideas amongst themselves, and to other interested people. We propose to develop a computer program to aid in this sketching.

In developing this program, the following techniques will be explored:

- Having an initial empty sandbox from which the structures can be "carved"
- Drawing layers by turning and sketching on the sides of the box
  - Layers will be interpolated from this
  - Modifying layers by sketching on them and pushing or pulling
- Drawing rivers by sketching on the surface of horizons
  - Will carve out a plausible river following this path
  - Allows adjustments of size and depth
- Picking layers with mouse pointer
  - Further editing of layer is then possible
  - Changing color
  - Setting tranparency
- Expanding sketch with new cubes
  - Drawing layers in the new cube might use the edges of layers in adjacent cube
  - While drawing lines will snap to existing lines

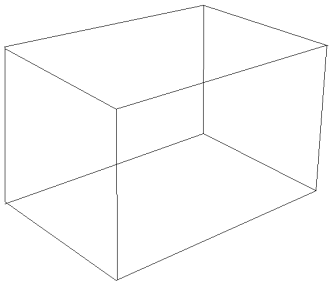

Figure 1: We start with the empty box

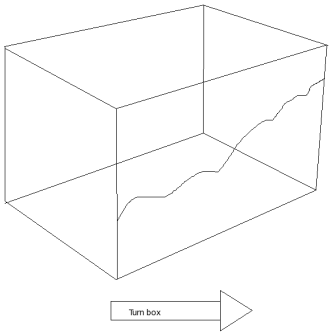

Figure 2: We draw the imagined layer in the box by turning it and drawing on the sides

Illustrations of use case

Here we show a possible sequence of manipulations to quickly create some geological structures in a scene.

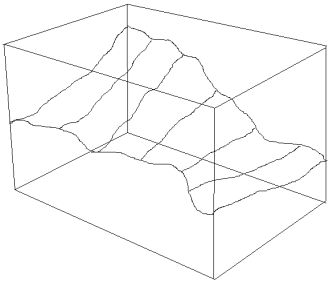

Figure 3: A layer is interpolated from the four sides we draw

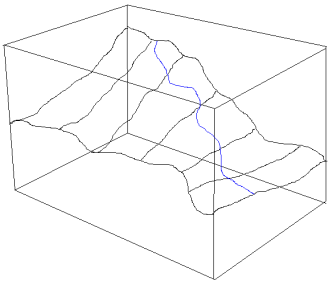

Figure 4: We draw a river path on this layer

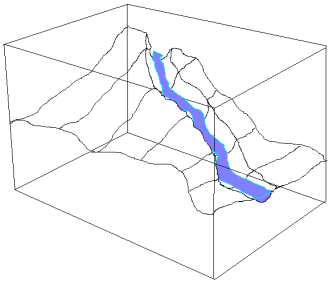

Figure 5: The computer will carve out from this layer as needed to make a river follow this path in a plausible way

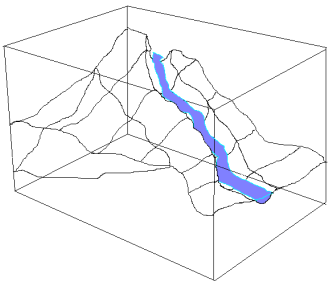

Figure 6: Now we draw a new layer. This can use the previous layer as a drawing surface in stead of only the sides of the box

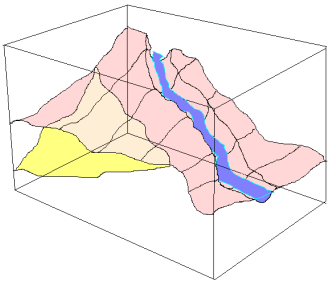

Figure 7: We add some color to the layers. In this figure the layers are partially transparent.

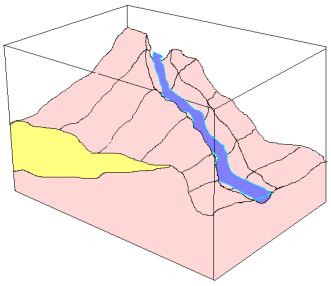

Figure 8: Here we have turned of tranparency and the sides become opaque

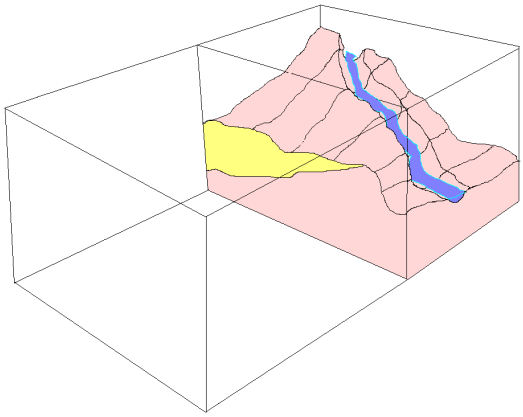

Figure 9: Now we might add a new cube to expand our drawing

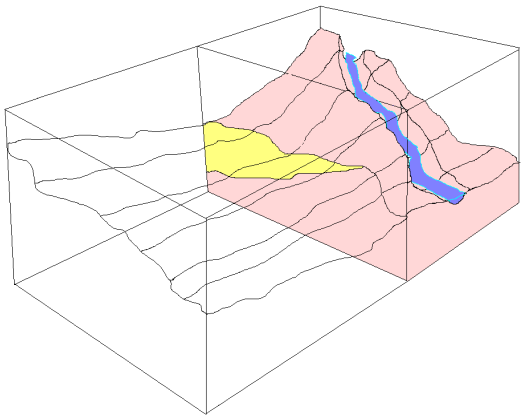

Figure 10: Drawing a new layer. Lines snap towards existing lines in adjacent cube.