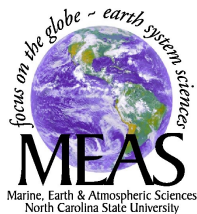


Multiple surface visualization

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Multiple surfaces in nviz

Outline

- Surface overlay and side-by-side visualization: rapidly changing topography – coast, urban areas
- Cutting planes with overlaid surfaces
- Dynamic surfaces with file sequencing tool

Start **grass61**

select location **nccoast-spft-wks06**

mapset **helena**

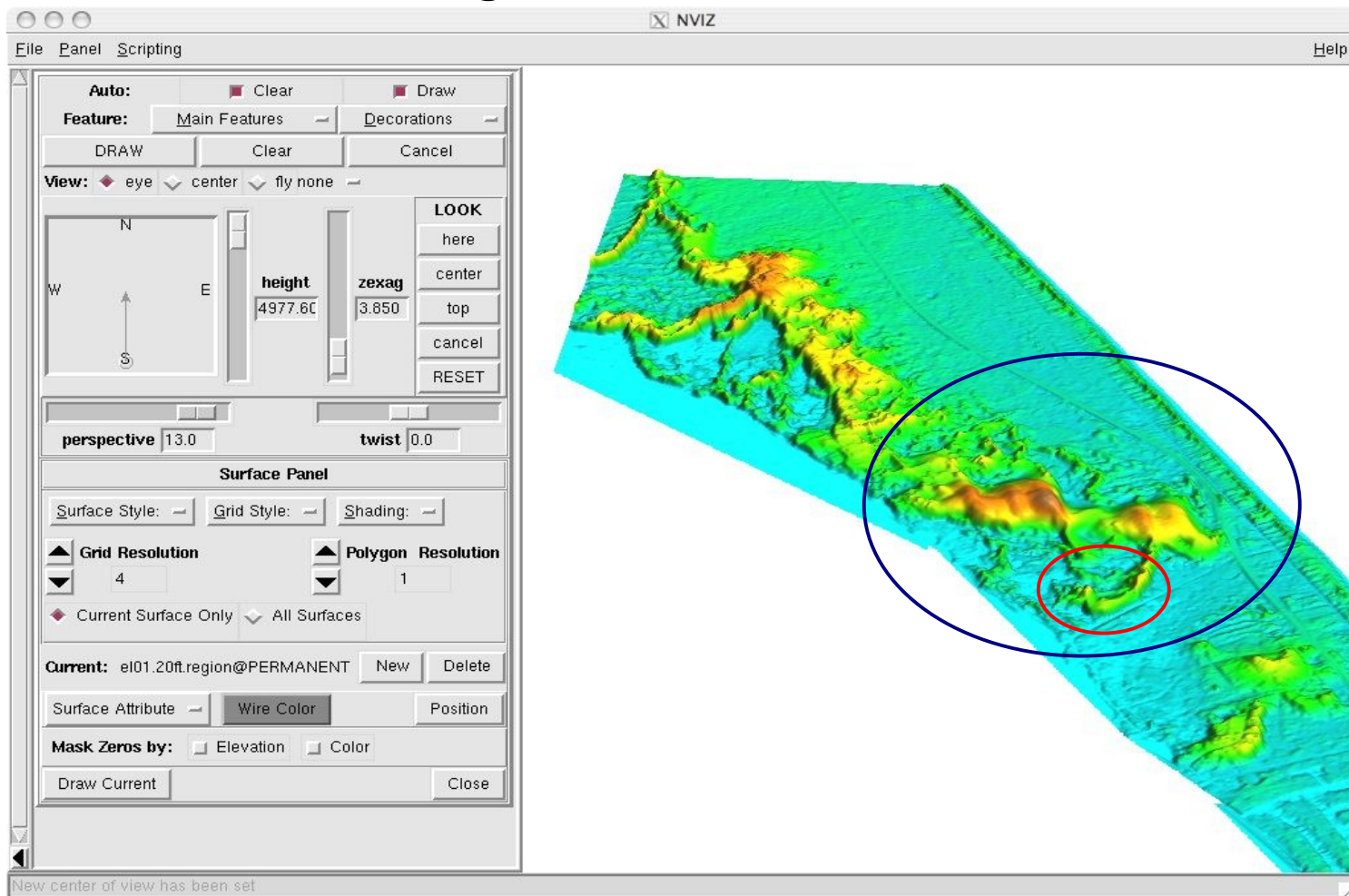
or create your own mapset and add helena

Study area: NC coastal dunes

View lidar based DEM for the region

g.region rast=el01.20ft.region -p

nviz el01.20ft.region



Multiple surfaces: Overlay

set region to a smaller area that we will use for practice

g.region rast=elev74.3ft res=6

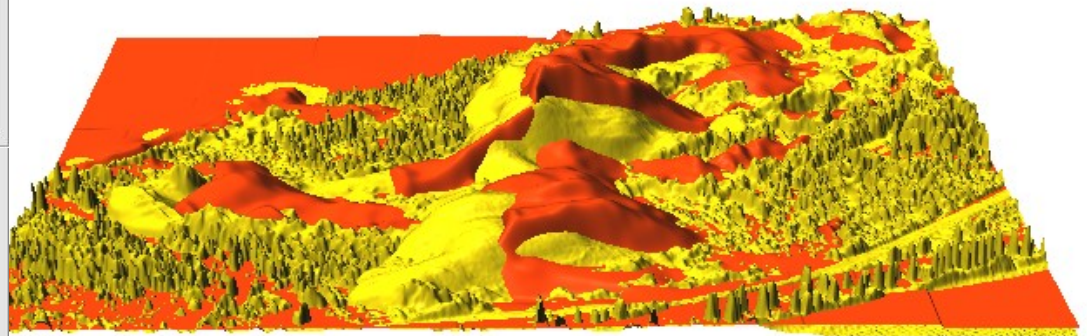
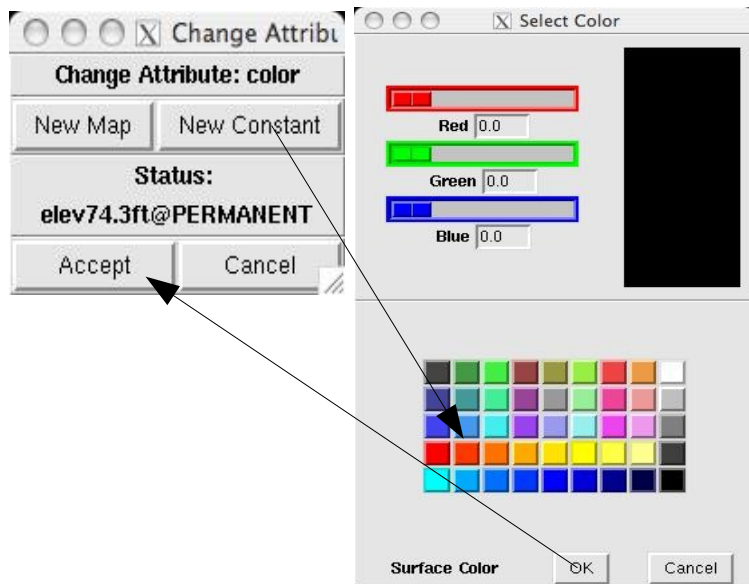
nviz elev74.3ft,elev99.3ft

set view approx from E, zexag 4, persp 20, height 1200

To compare the surfaces we give each a constant color:

**Surface attrib -> change color ->New constant->red
->OK -> Accept->Draw**

change Current to elev99.3ft and do the same with yellow



Multiple surfaces: cut plane

To improve vertical shape perception add 0ft plane

Panel->Surface->New->Constant->enter 0->Accept

change its Subsampling Fine to 1

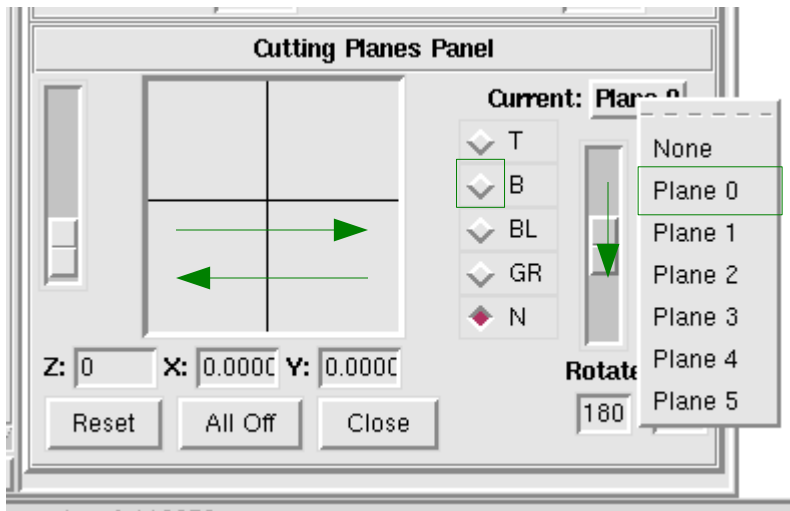
Add cutting plane

Panel->Cutting Planes->Current Plane 0

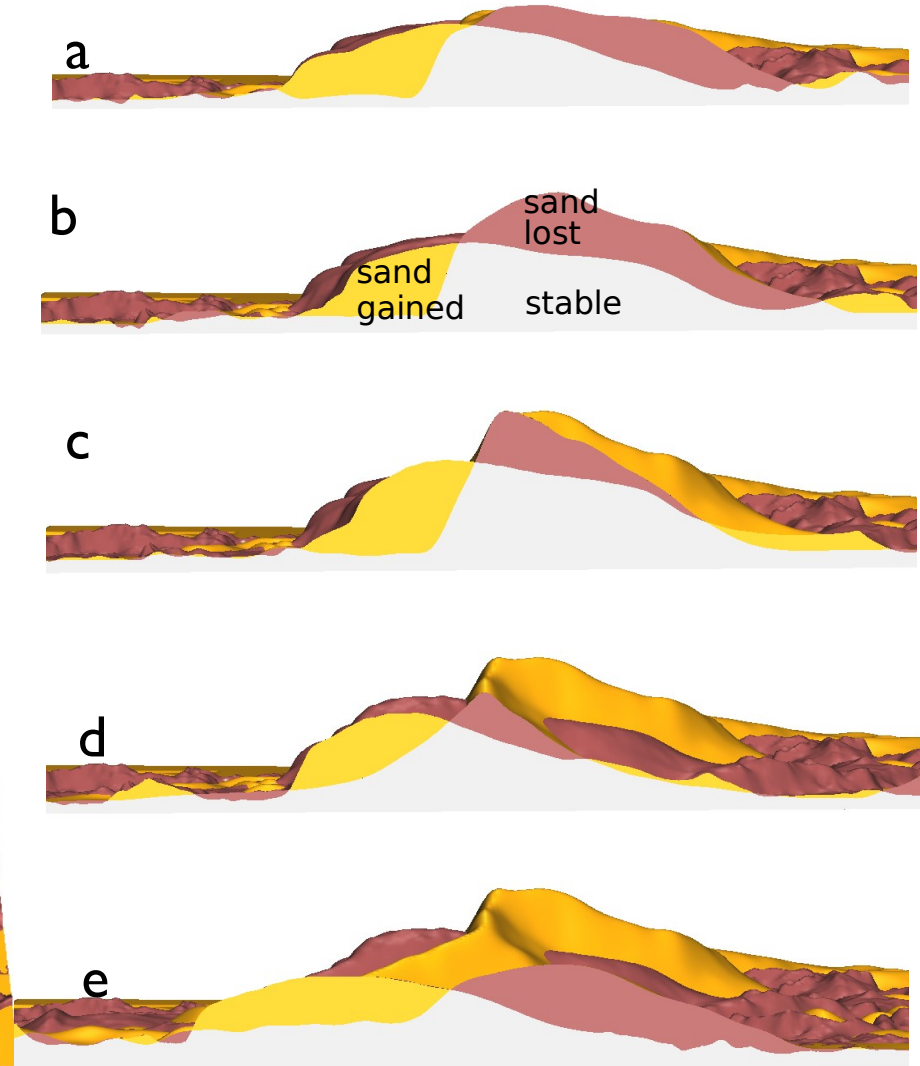
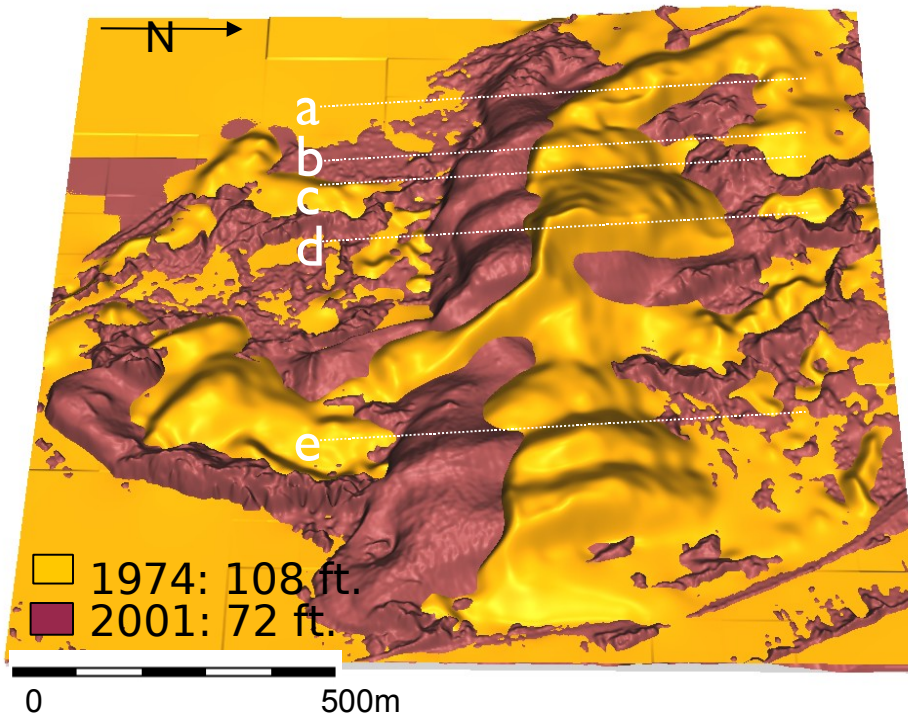
Rotate 180, Color B or T, move crosshair East to West

To better distinguish the cut

Panel->Lightning lower Brightness to 0.16



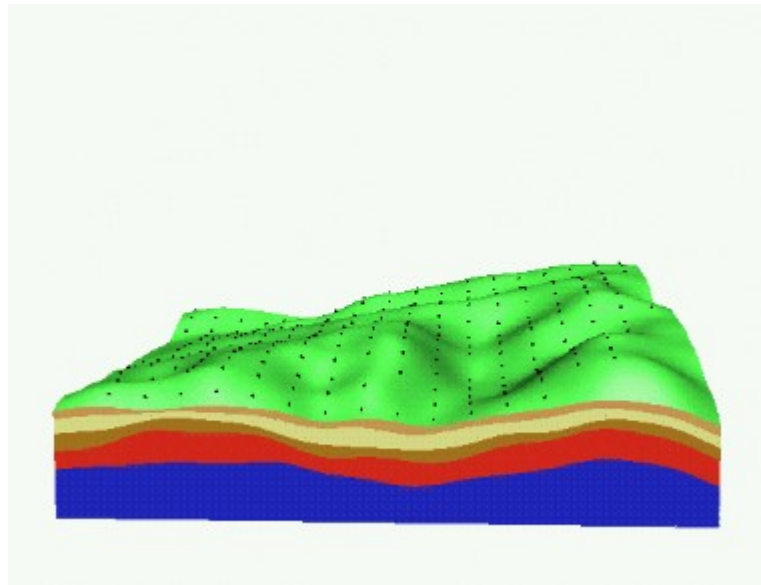
Example Application: Dune Migration



The main dune rotates clockwise while its peak moves southeast. Volume and area are relatively stable

Cutting plane with animation

surfaces move closer as the cutting plane moves farther to keep the crosssection at the same distance from the viewer



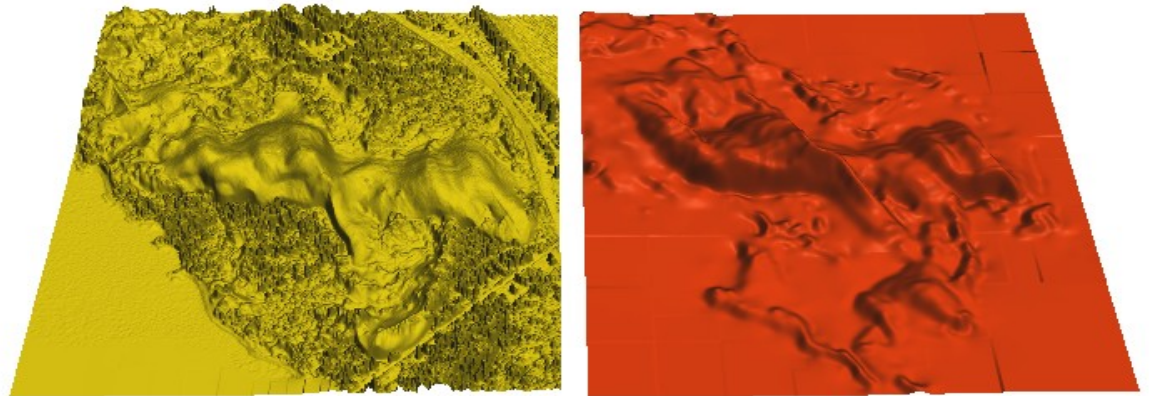
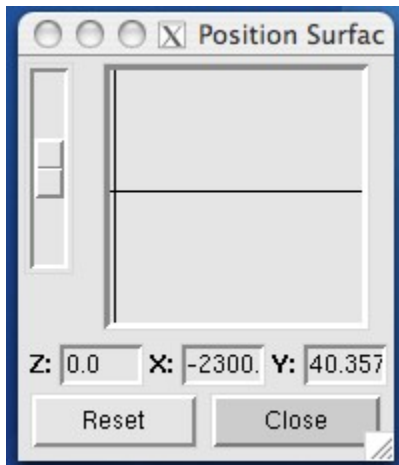
Multiple surfaces: side-by-side

Delete 0ft plane, set cutting plane to None
View from S, height 3500

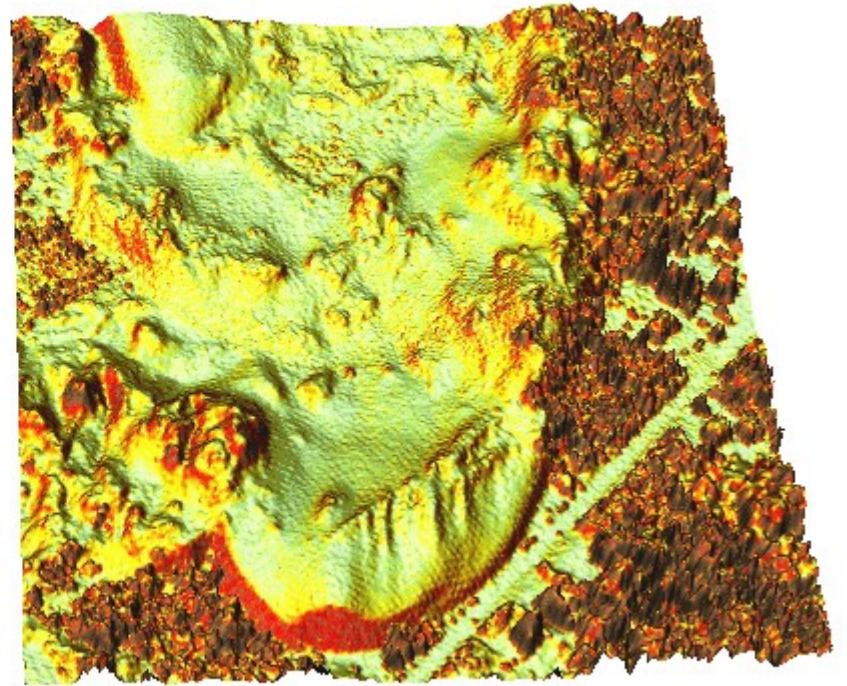
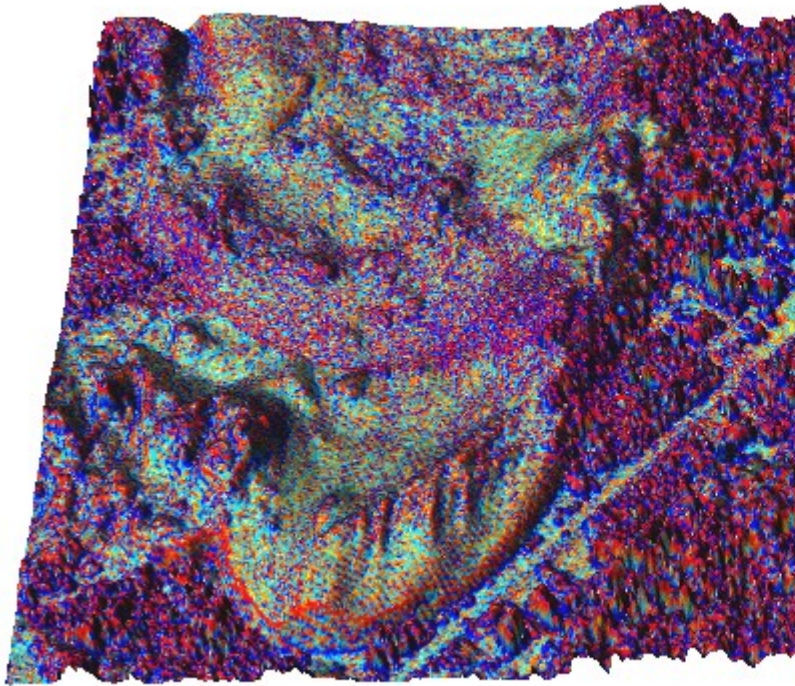
Panel->Surface->Position

move crosshair to the right, change current surface to elev99
and move crosshair to the left

You can change the lighting, view, for both simultaneously



Tuning the level of detail for feature extraction



Visualization: dynamic surfaces

xganim wqw*

put it into the loop, slow it down,
step through the frames to find what to include

File name

Steady state
after wqw.0142

Visualization: dynamic surfaces

```
nviz lid99.el co=wqw.0166  
zex-5, height 500, view N, light N, persp=25
```

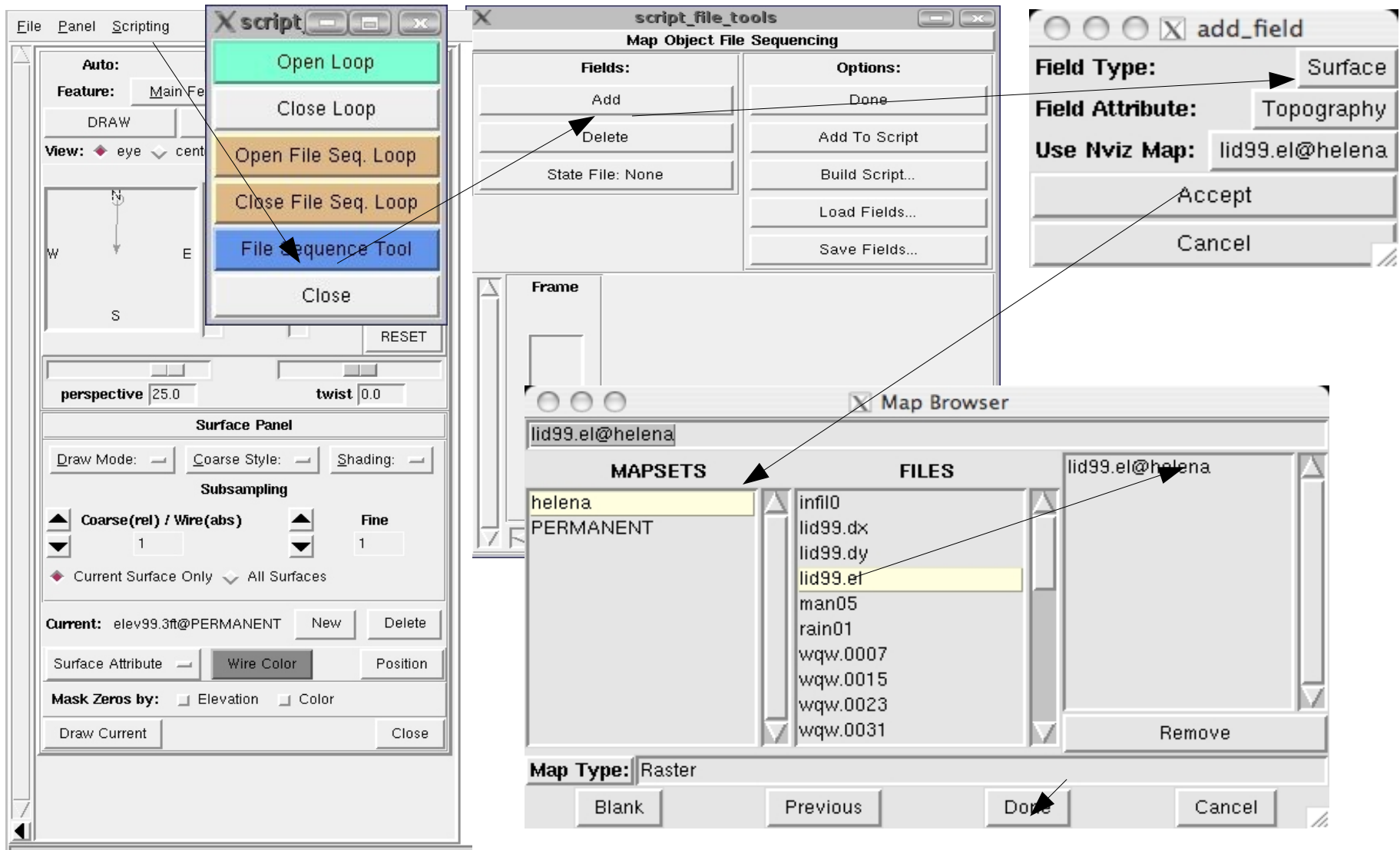
Scripting -> Script Tools -> File sequence tool
Fields -> Add
Field type -> surface
attribute -> topo
use nviz map lid99.el
Accept

Map browser
click mapset [helena](#) file [lid99.el](#) appears in 3rd window
done

same with attribute color, select time series wqw* in map browser
save fields

build script, name it, enter image root name, accept, done
play script

Visualization: dynamic surfaces

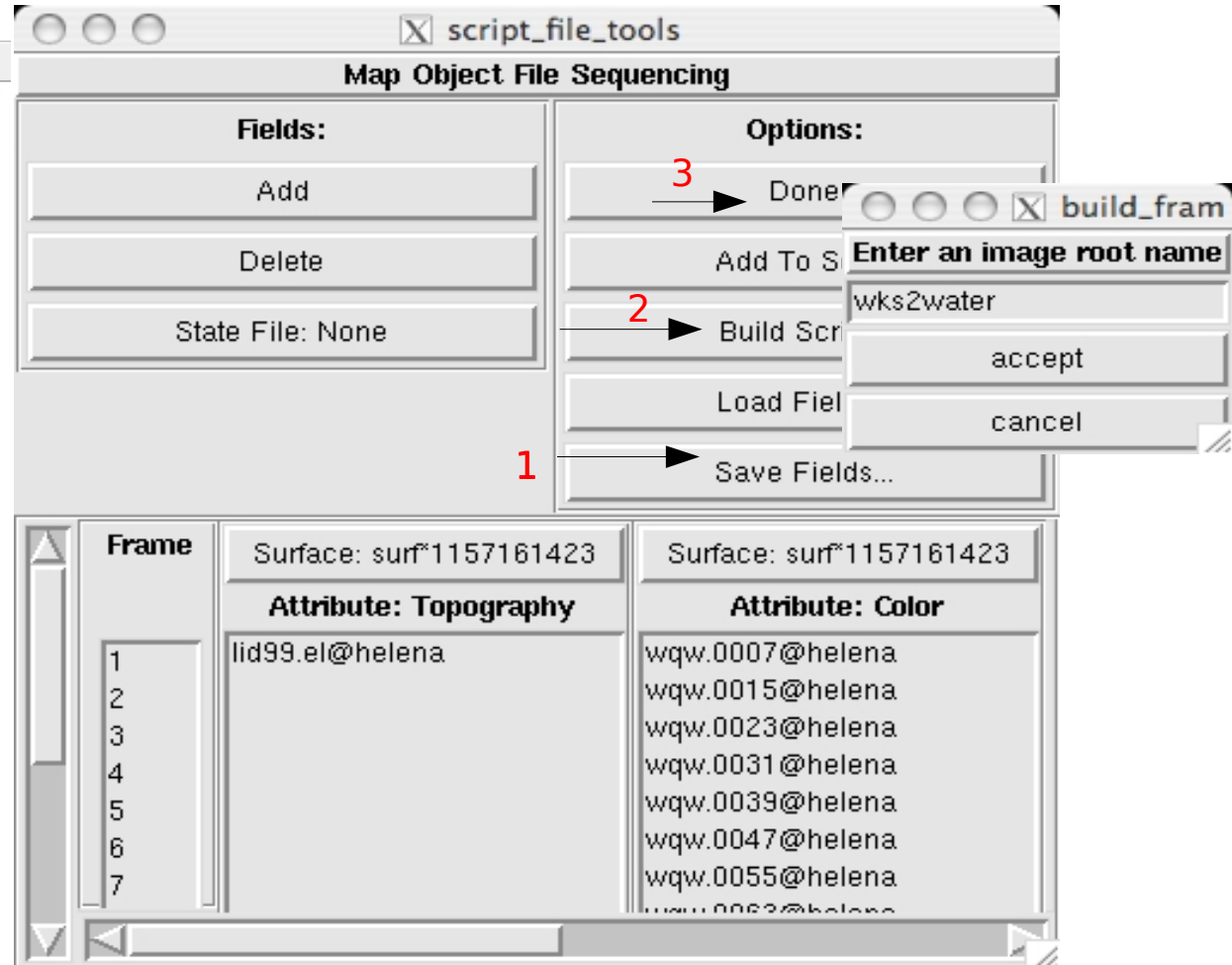
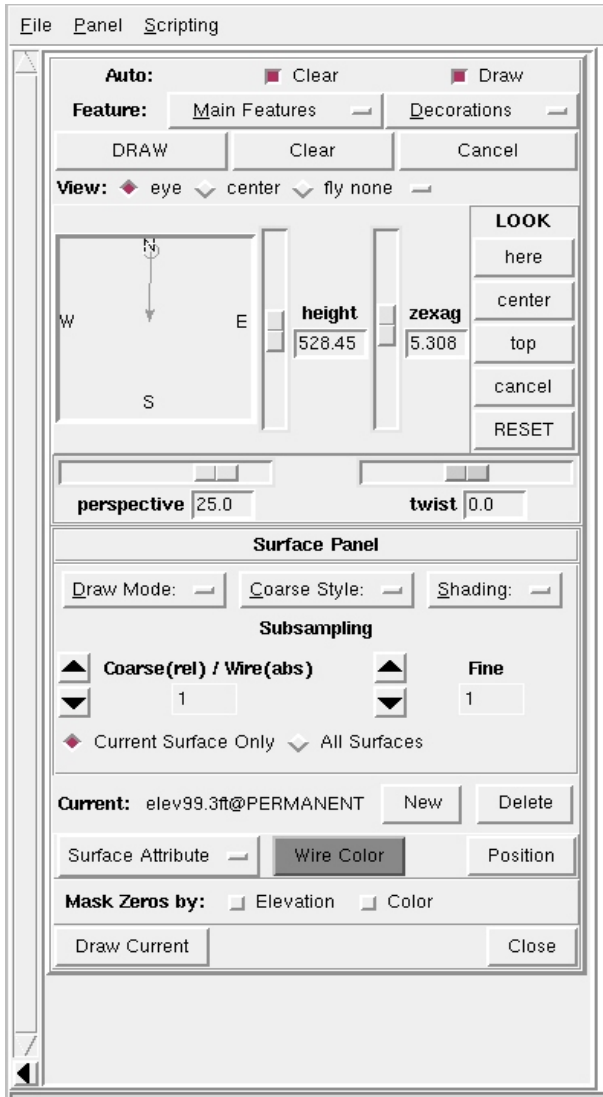


Visualization: dynamic surfaces

The image displays a software interface for dynamic surface visualization, consisting of several interconnected panels and dialog boxes.

- Main Panel (Left):** Features a top section with 'Auto' (Clear/Draw) and 'Feature' (Main Features/Decorations) controls. Below are 'DRAW', 'Clear', and 'Cancel' buttons, and a 'View' section with 'eye', 'center', and 'fly none' options. A central 3D view shows a coordinate system with 'W', 'E', and 'S' axes. To the right are 'LOOK' controls (here, center, top, cancel, RESET) and 'height' (528.45) and 'zexag' (5.308) sliders. At the bottom are 'perspective' (25.0) and 'twist' (0.0) sliders.
- script_file_tools (Top Center):** A dialog titled 'Map Object File Sequencing' with 'Fields:' and 'Options:' sections. The 'Fields:' section has 'Add', 'Delete', and 'State File: None' buttons. The 'Options:' section has 'Done', 'Add To Script', 'Build Script...', 'Load Fields...', and 'Save Fields...' buttons. A 'Frame' button is at the bottom.
- add_field (Top Right):** A small dialog with 'Field Type:' set to 'Surface', 'Field Attribute:' set to 'Color', and 'Use Nviz Map:' set to 'lid99.el@helena'. It has 'Accept' and 'Cancel' buttons.
- Map Browser (Bottom Center):** A dialog showing a list of files. The 'MAPSETS' section lists 'helena' and 'PERMANENT'. The 'FILES' section lists various files like 'wqw.0094', 'wqw.0102', etc., with 'wqw.0126' highlighted. A 'Remove' button is at the bottom right. The 'Map Type:' is set to 'Raster'. Navigation buttons 'Blank', 'Previous', 'Done', and 'Cancel' are at the very bottom.
- Surface Panel (Bottom Left):** A panel for surface configuration. It includes 'Draw Mode:', 'Coarse Style:', and 'Shading:' options. A 'Subsampling' section has 'Coarse (rel) / Wire (abs)' and 'Fine' settings, both set to '1'. There are 'Current' (elev99.3ft@PERMANENT), 'New', and 'Delete' buttons. 'Surface Attribute' is set to 'Wire Color' and 'Position' is also visible. 'Mask Zeros by:' has 'Elevation' and 'Color' options. 'Draw Current' and 'Close' buttons are at the bottom.

Visualization: dynamic surfaces



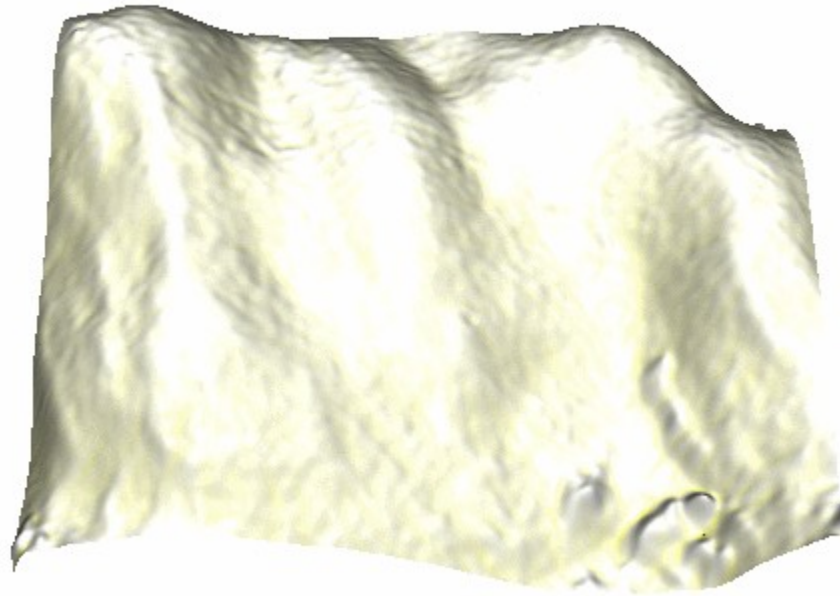
Scripting -> Play script

Visualization: dynamic surfaces

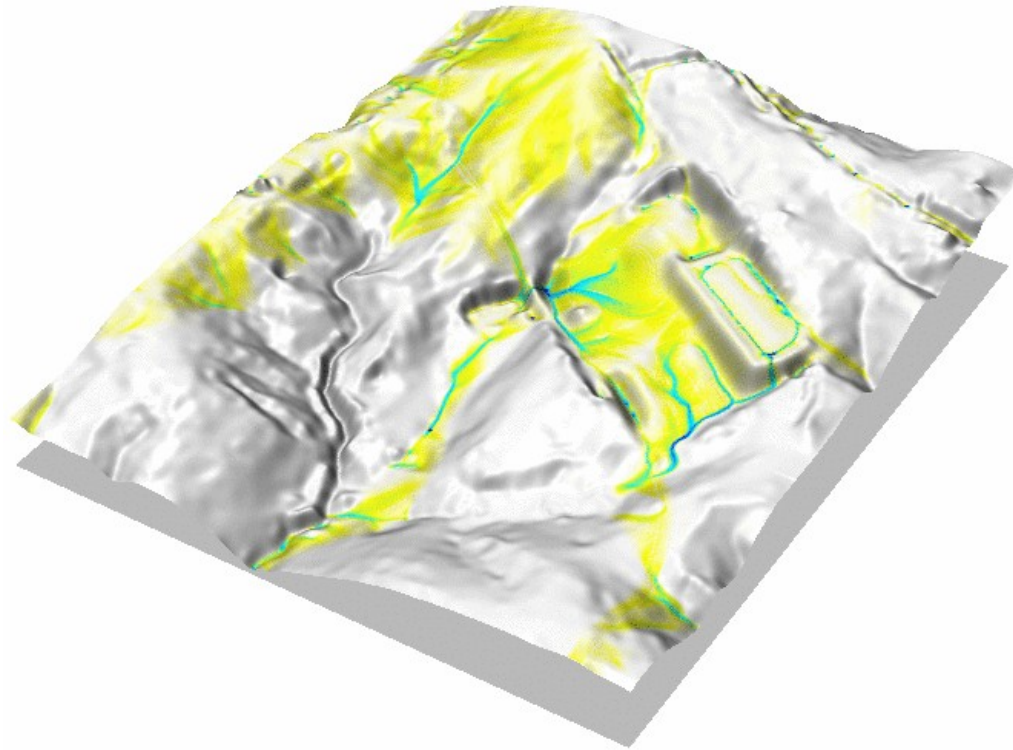
Play script will render the surfaces (it is slow) and save them as a series of rgb images.

Create an animated gif

convert -delay 20 -loop 10 wks*.rgb wateranim3.gif

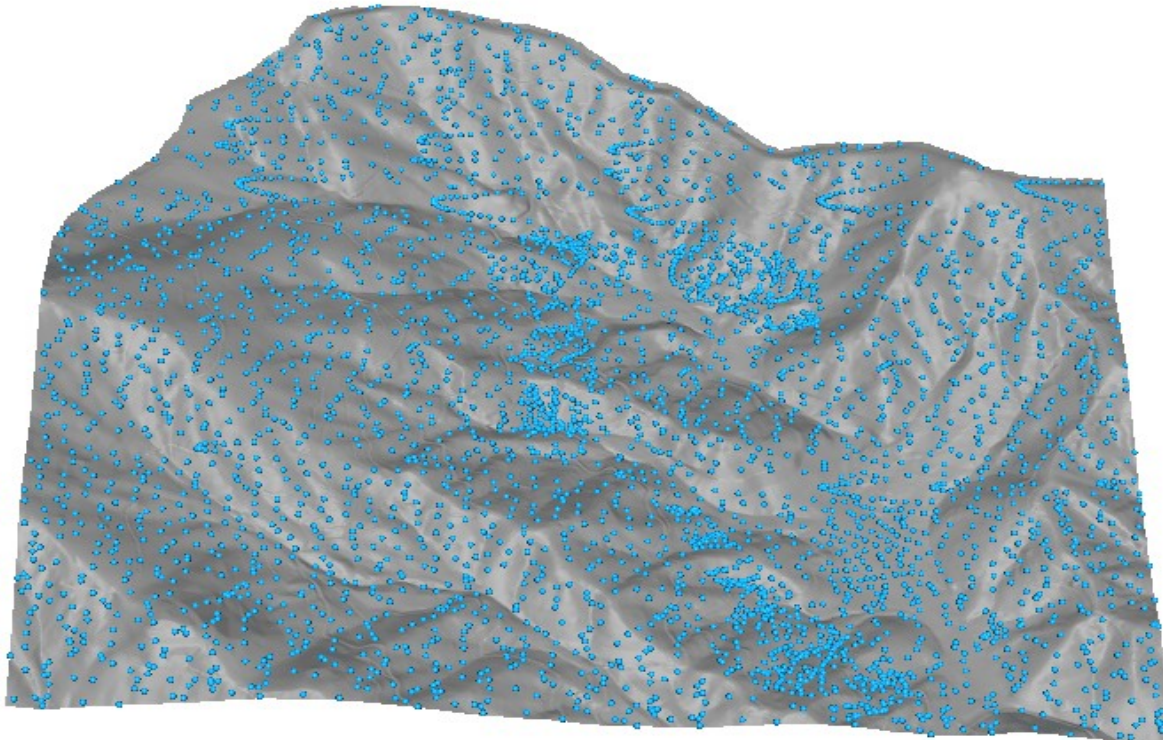


Visualization: dynamic surfaces



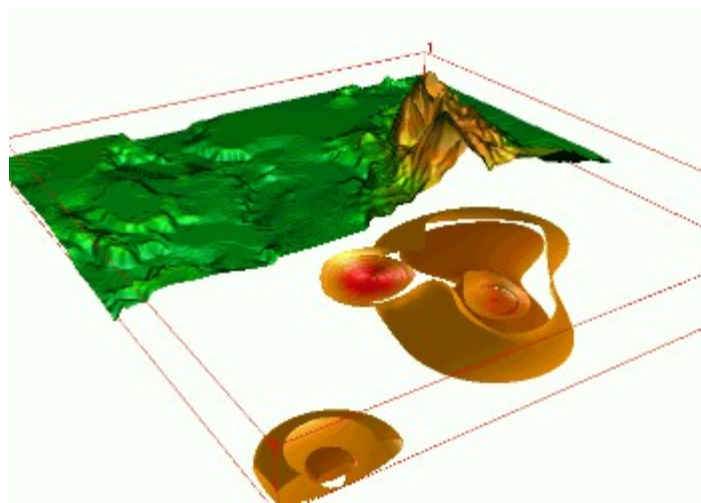
More complex water on terrain

Visualization: dynamic surfaces



Points on surface

Visualization: dynamic surfaces



4D visualization – theoretically can be done in GRASS6, this was done in GRASS4.1 using prototype module sg4d

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