

# GIS: Geographic Information Systems

## Module 13: Three Dimensional Visualization

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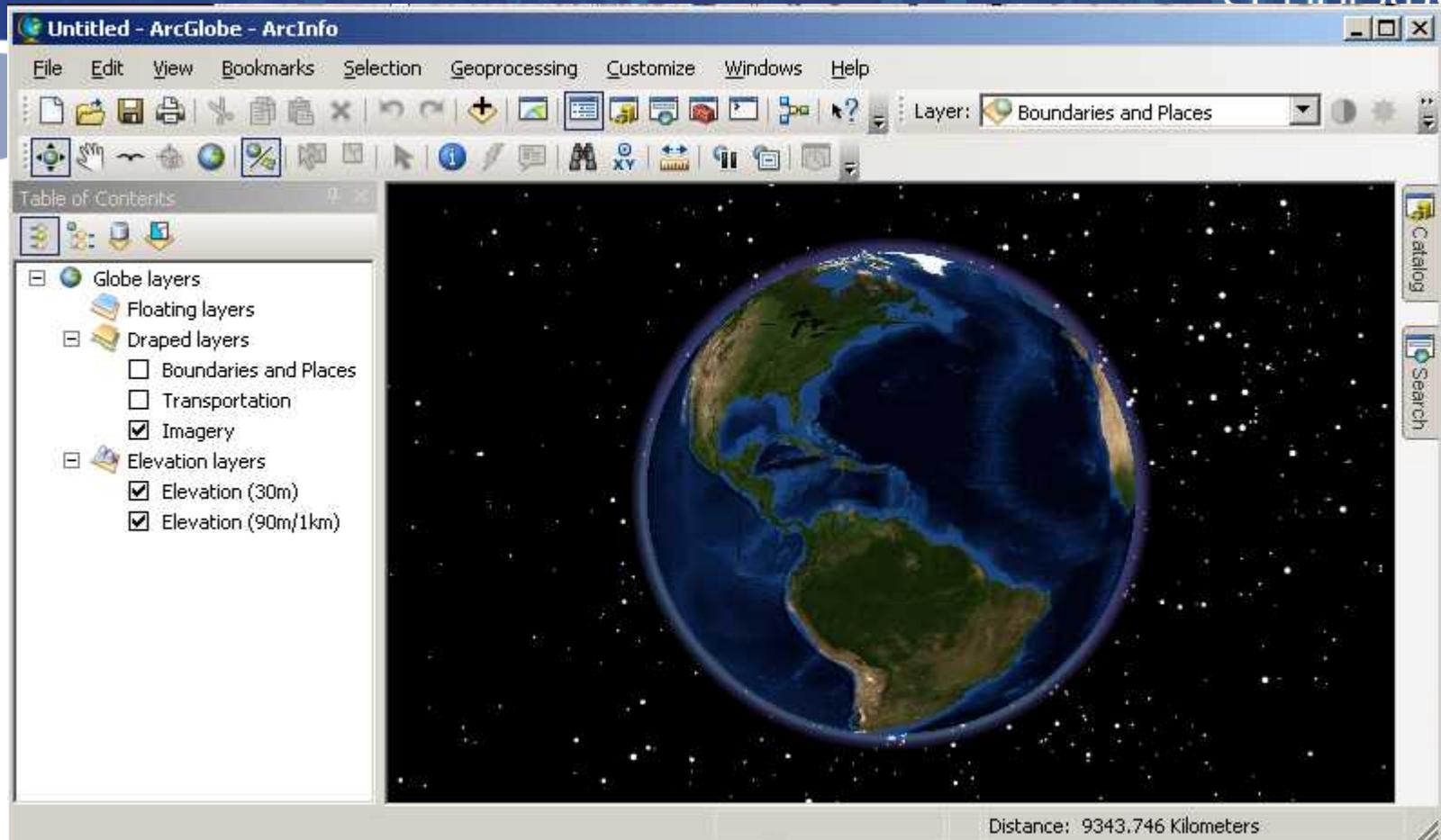
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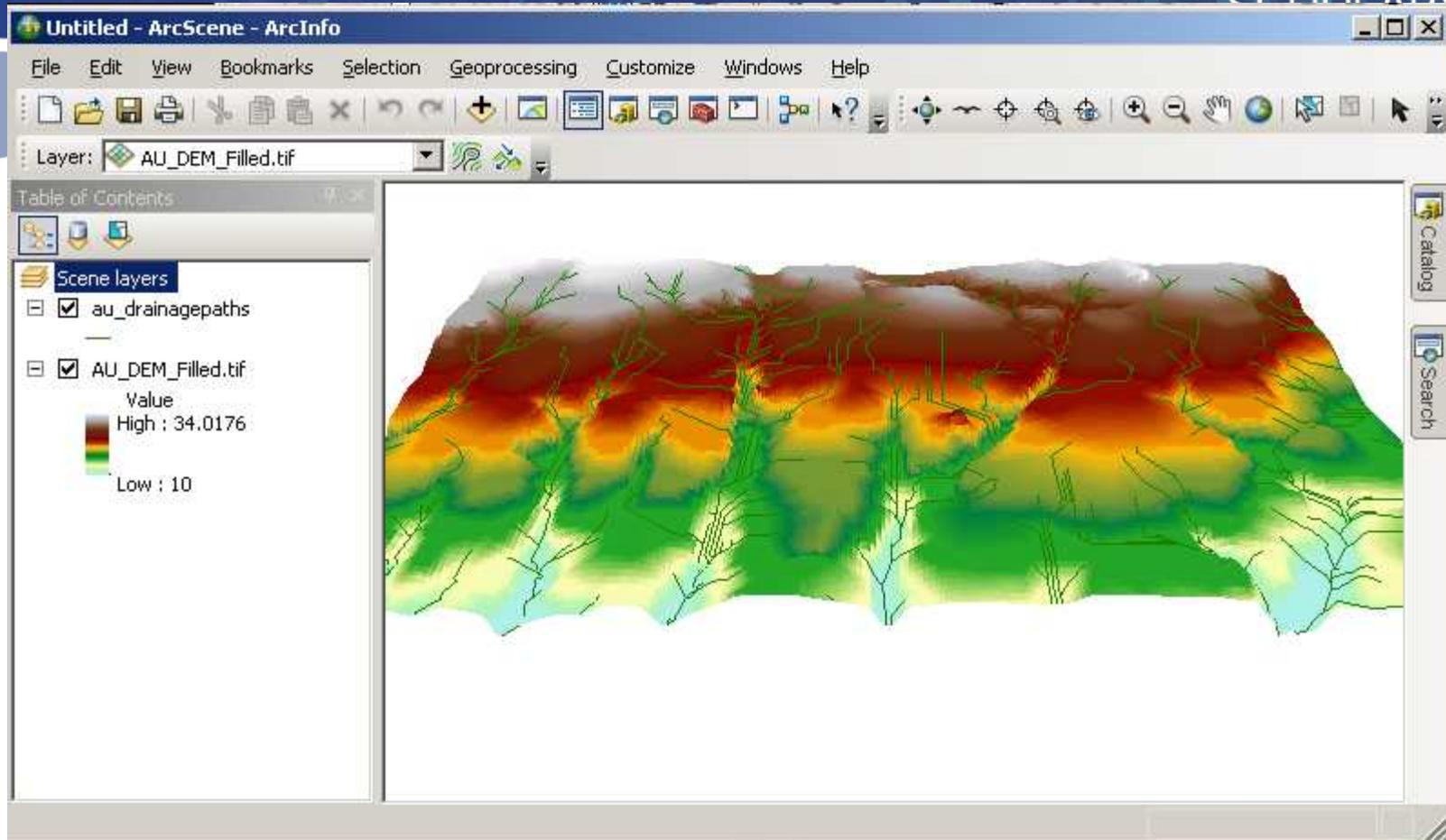
[library.nd.edu/cds/](http://library.nd.edu/cds/)

# 3D visualization

- Most new GIS programs have ways of viewing data in 3D.
- In ArcGIS there are two:
- ArcGlobe is for large scale phenomenon and tries to be like Google Earth
- ArcScene works in true 3D: better for small phenomenon without the need for spherical projection.



GIS data on a 3D globe



Plano-metric (real 3D) view

- Layers can have different roles within the 3D view
  - can also be used to describe the surface.
- The extent of a 3D view is handled differently
  - Data viewed from an oblique angle, so a 3D view extent is not a simple rectangle.
- The layer drawing priority is not as simple as the order in the table of contents.
  - Just because one layer is on above another does not mean it will be displayed on top.

# Types of 3d data

- **Vector**

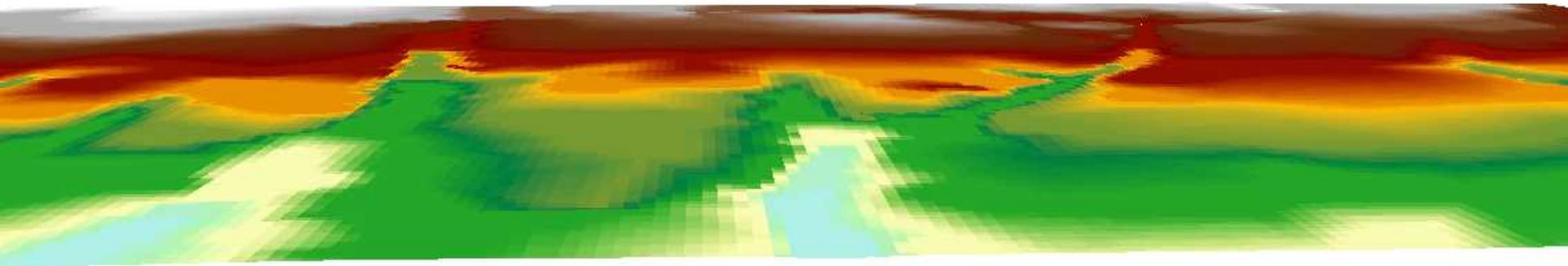
- Any shapefile can be “Z-aware”
  - Vertices will have an X, Y, and Z value
- Each feature can also have its elevation stored in the attribute table
  - This is easier to edit
  - Best for points. Lines and polygons will be flat
- Features can also be “draped” over an existing surface

- **Raster**

- A DEM or TIN can be displayed with elevation values
- Other raster images can be “draped” over existing topographic surfaces

# Vertical Exaggeration

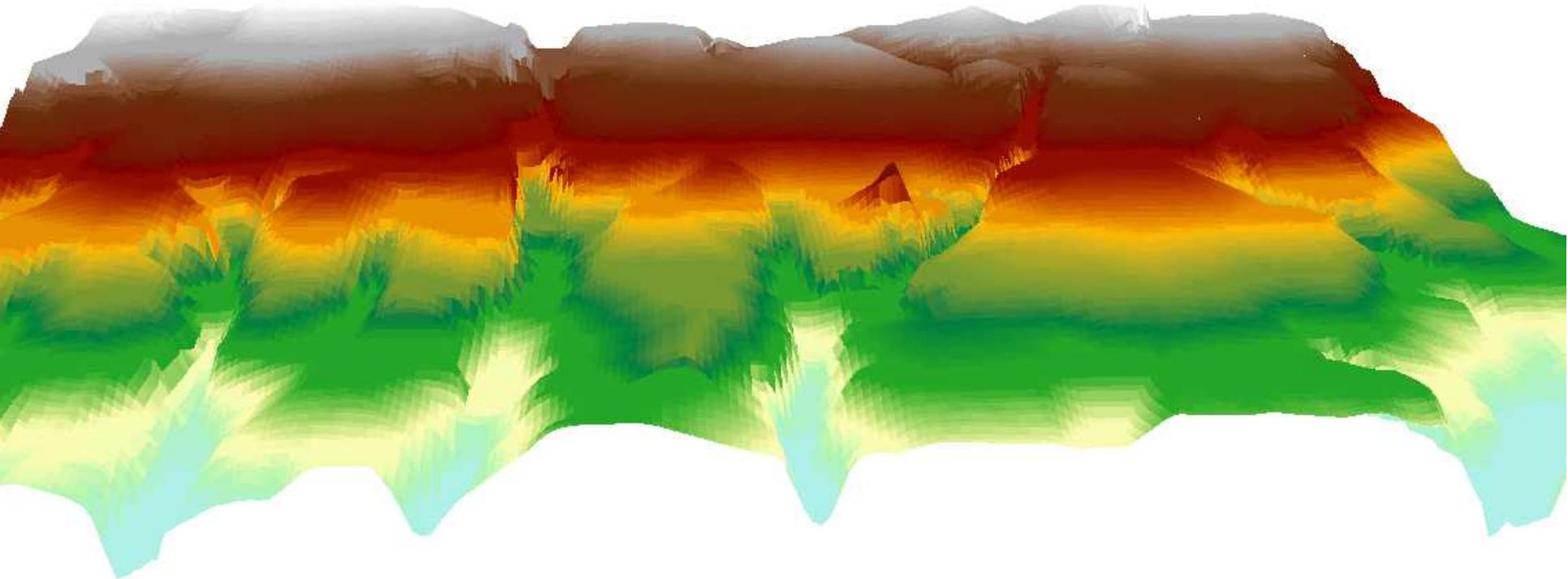
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DEM without vertical exaggeration

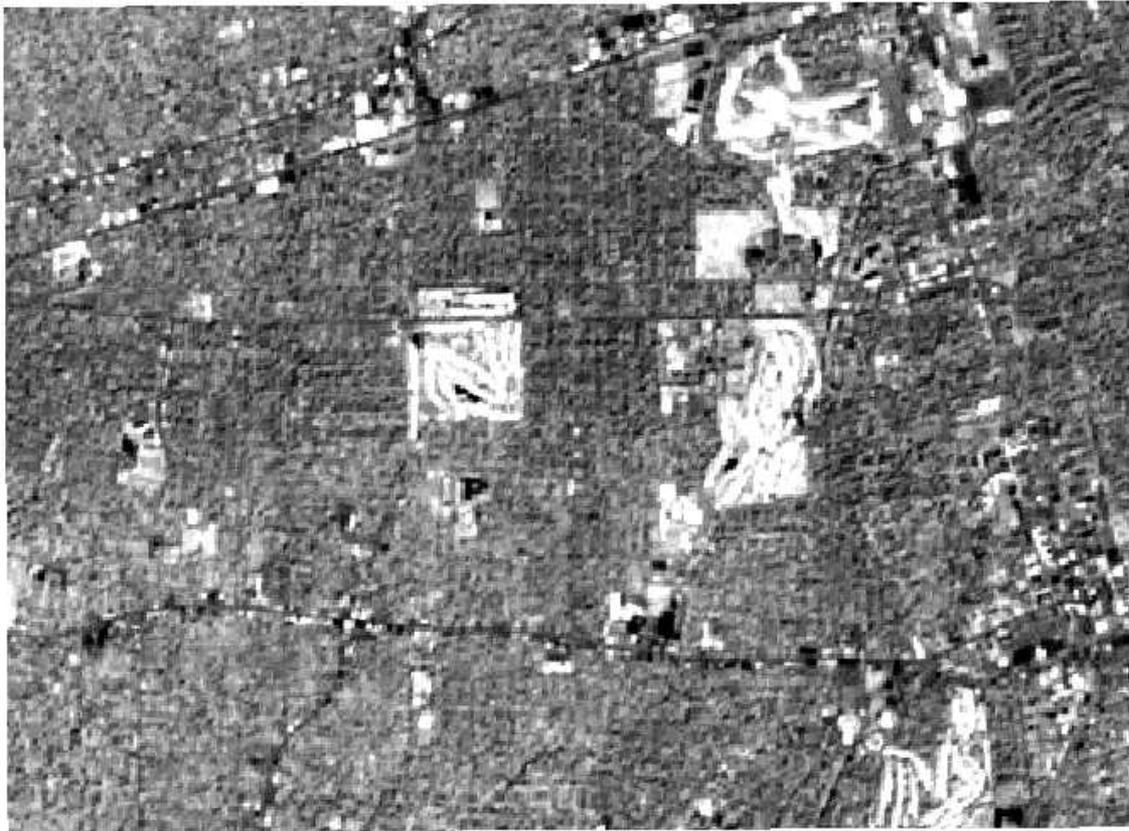
# Vertical Exaggeration

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DEM with 60x vertical exaggeration

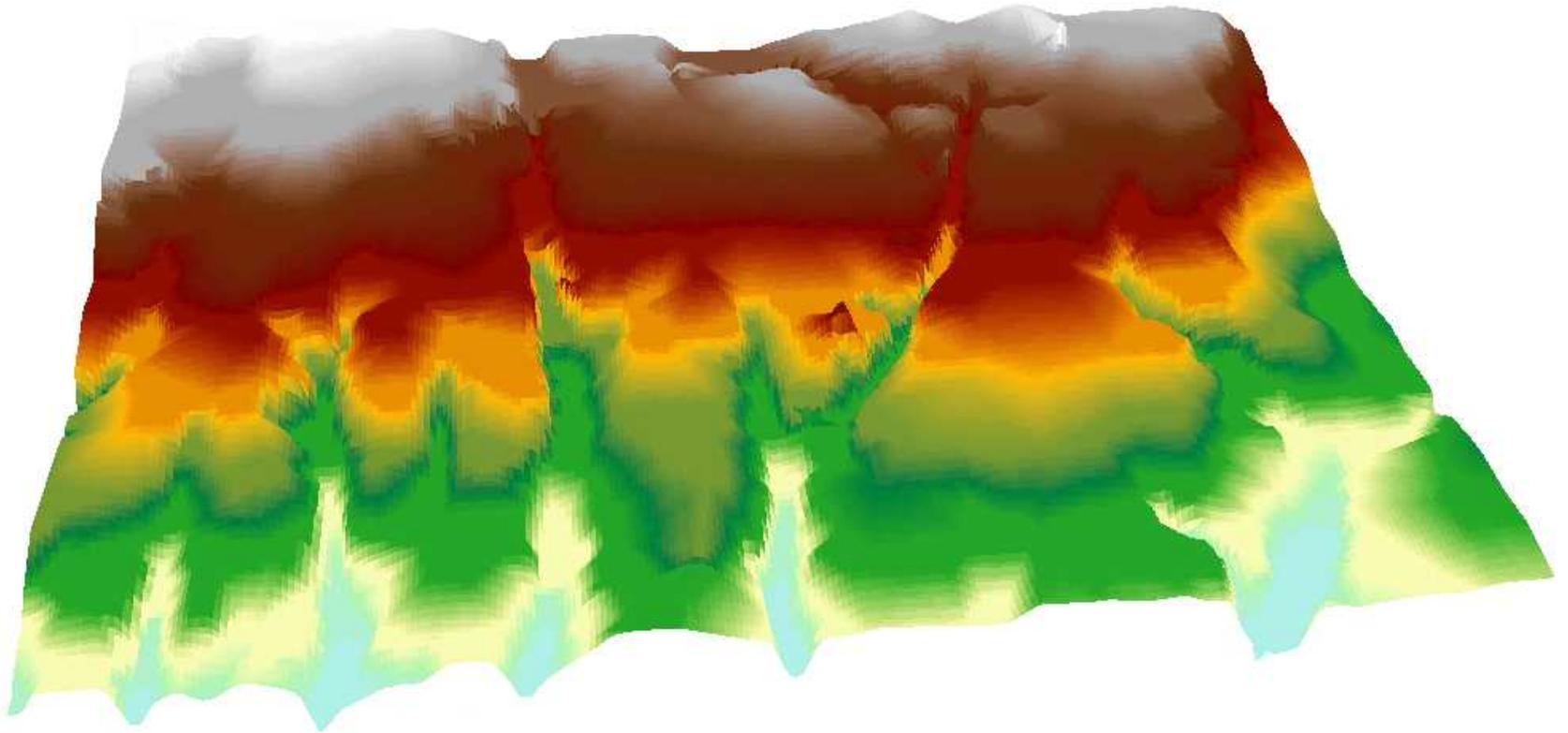
# Draping a raster over elevation data



Landsat ETM+ in 2d

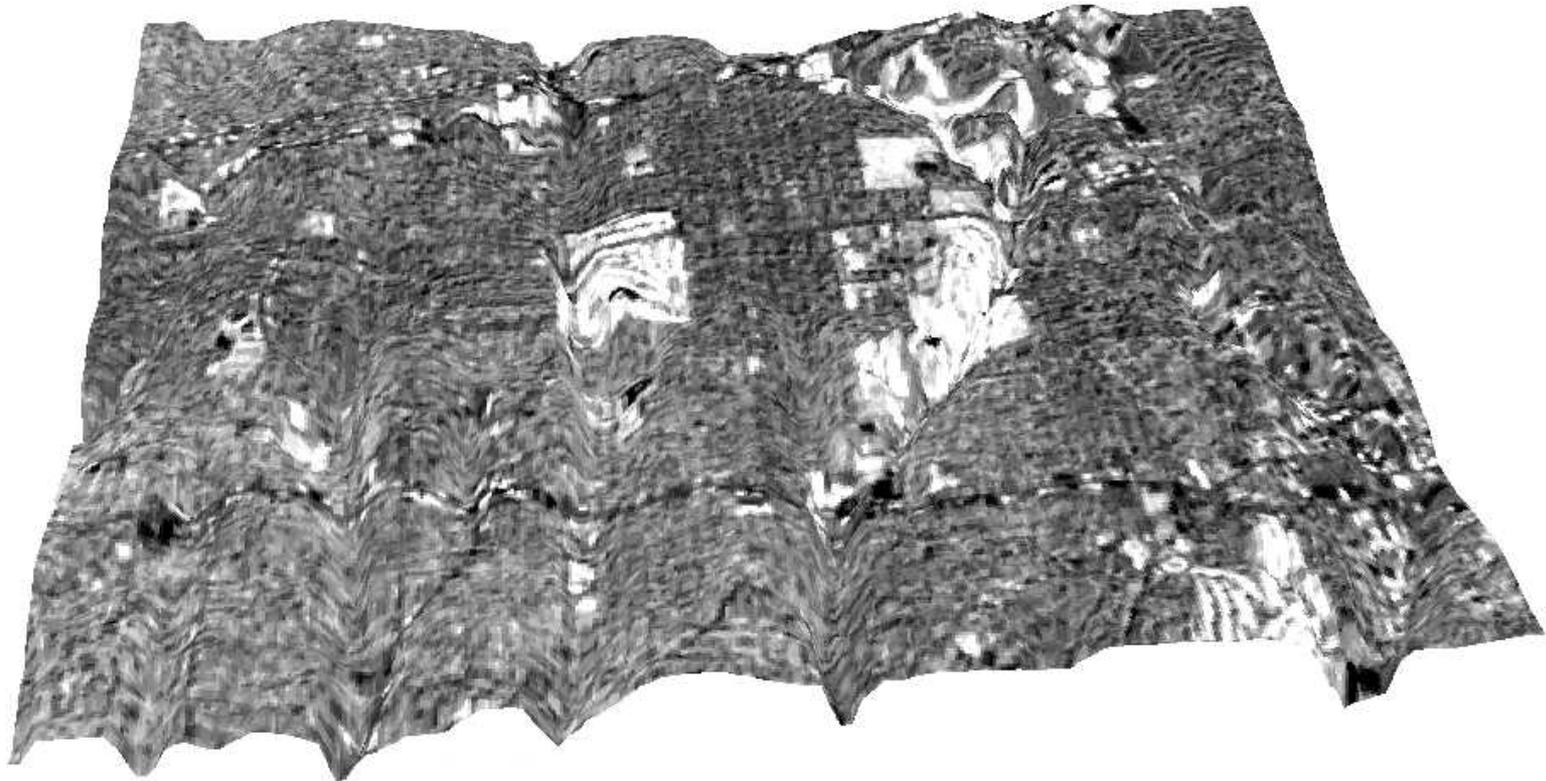
# Draping a raster over elevation data

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DEM in 3d

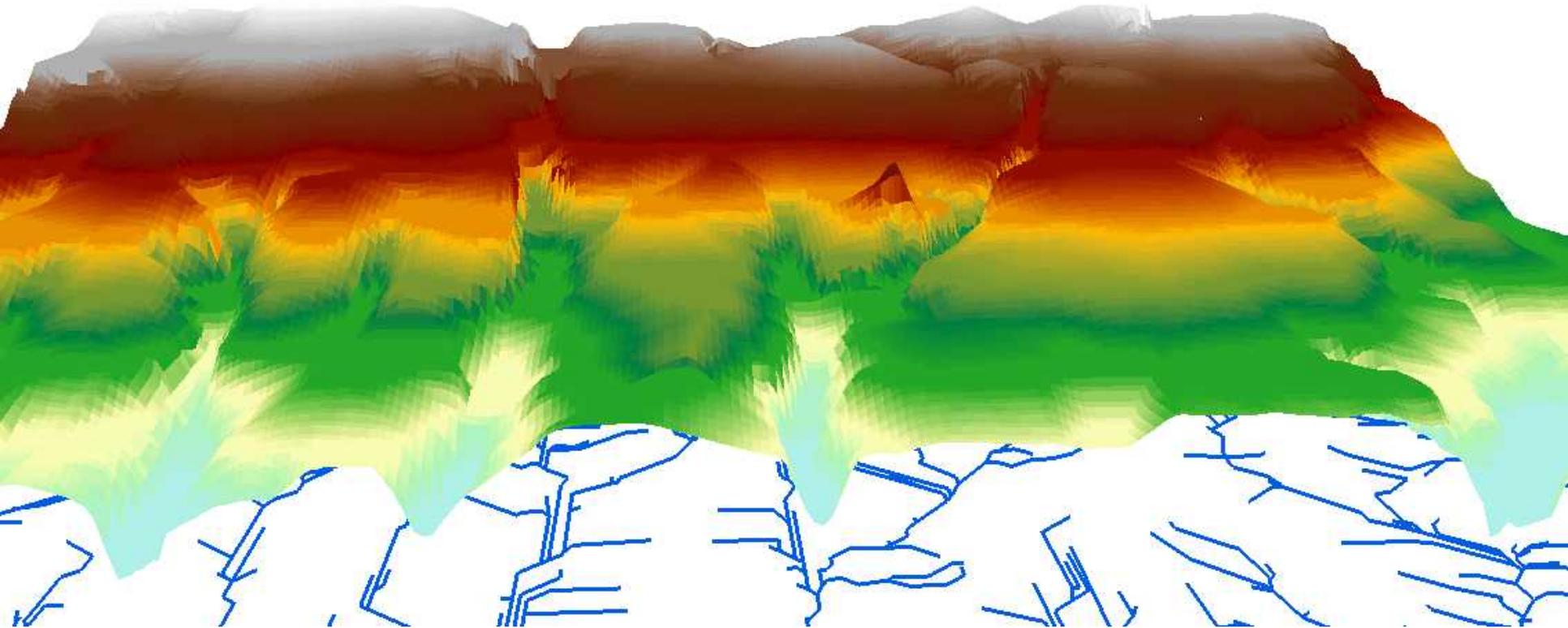
# Draping a raster over elevation data



Landsat ETM+ with elevation based on DEM

# Draping vectors over elevation data

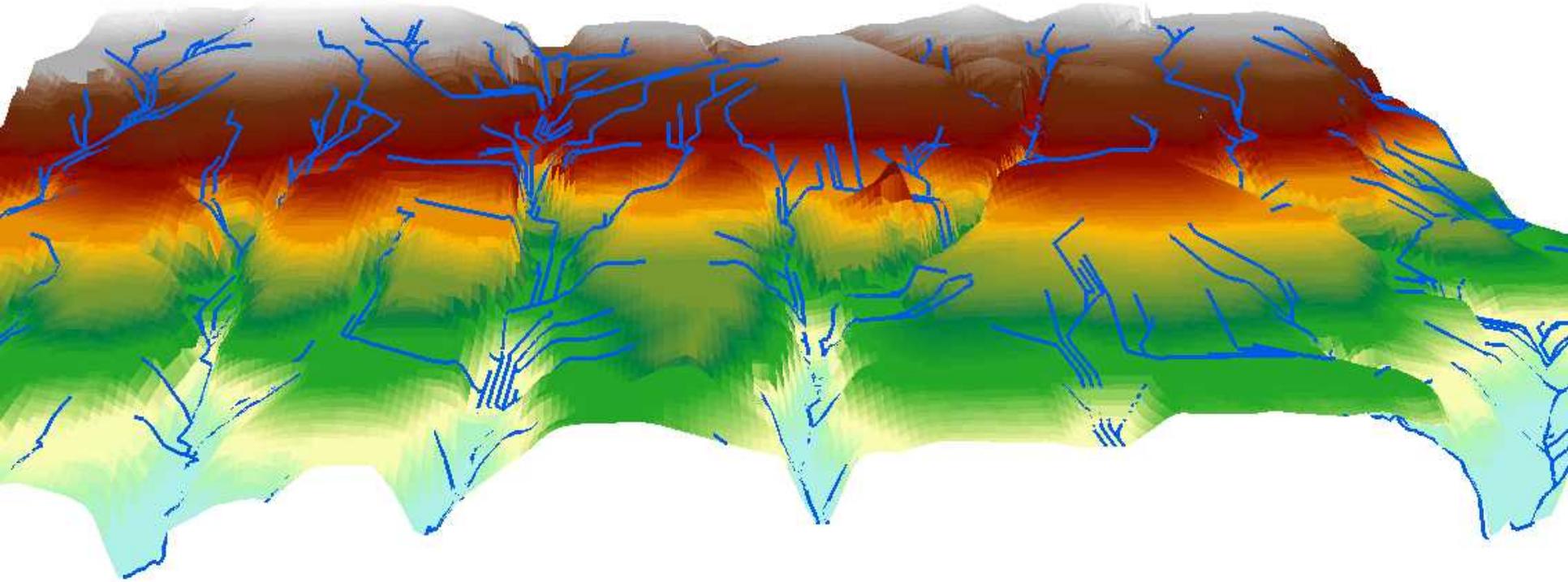
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DEM and unmodified drainage polyines

# Draping vectors over elevation data

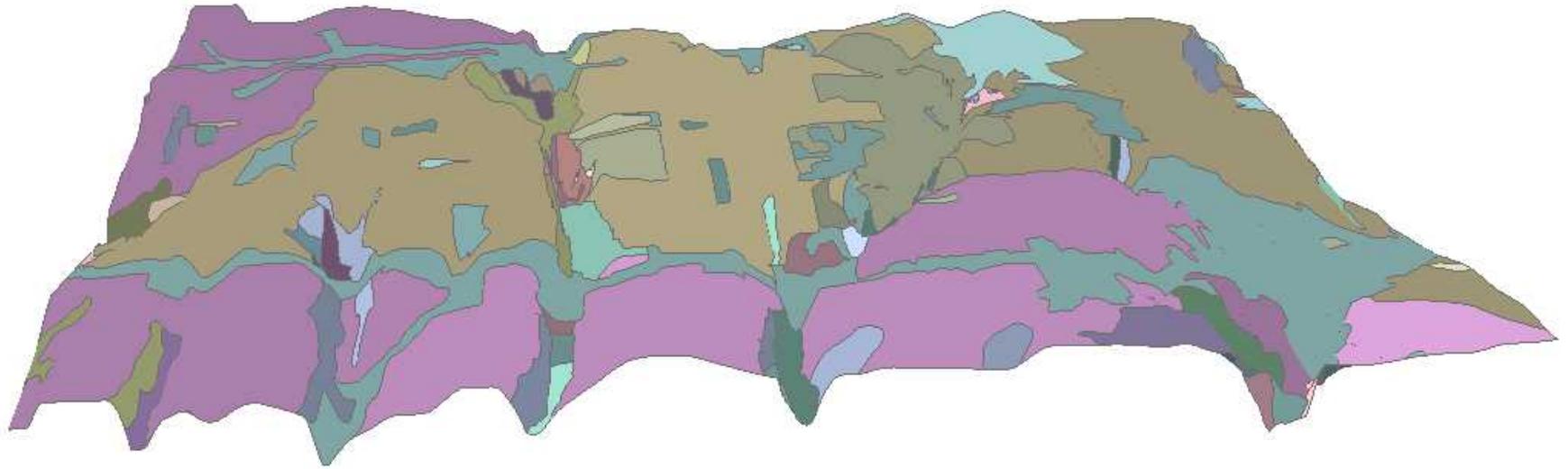
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Drainage polylines given elevation base on DEM

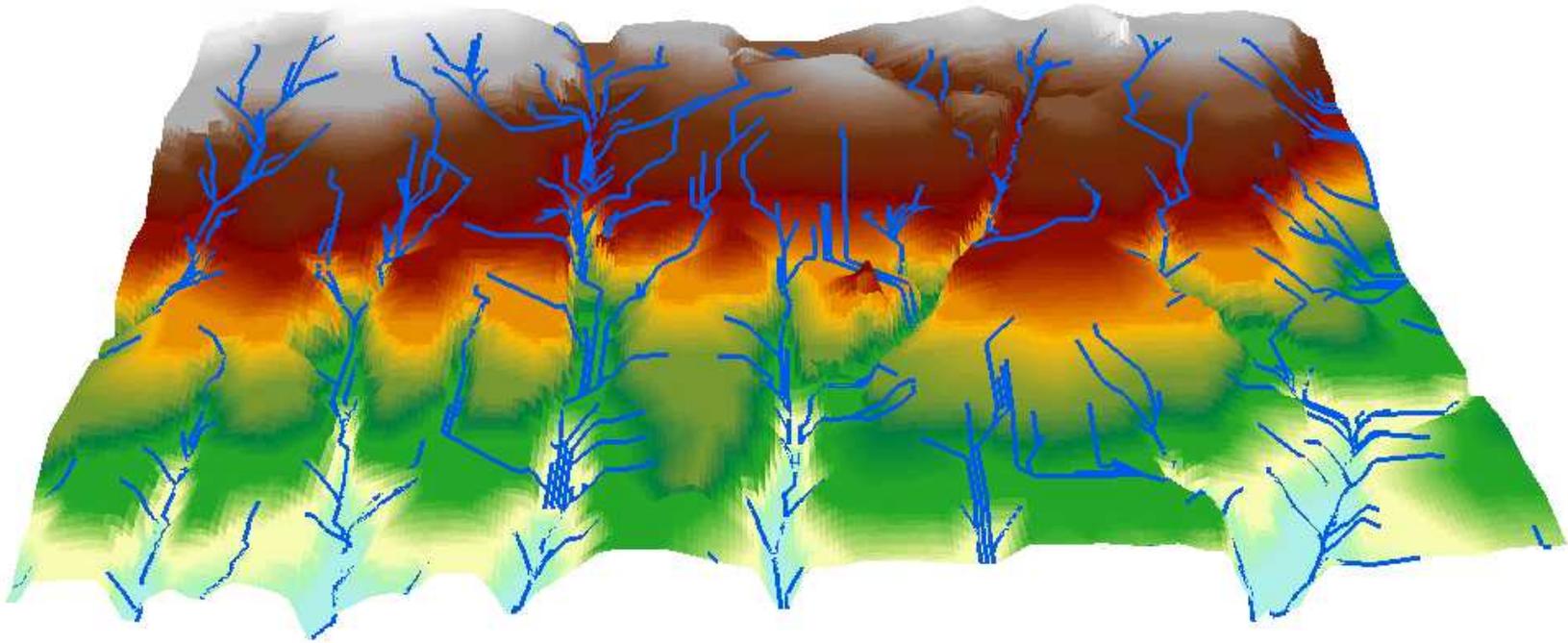
# Draping vectors over elevation data

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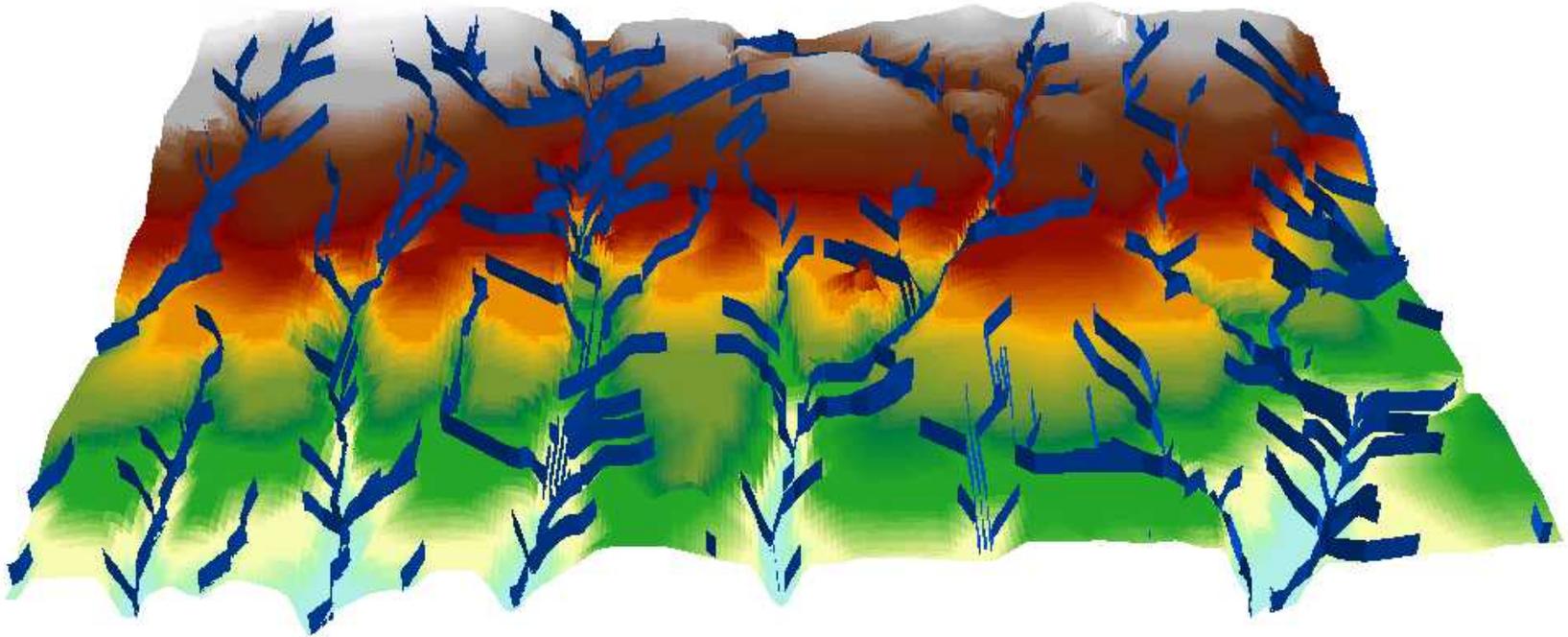
Soils polygons given elevation based on DEM

# Extruding Features



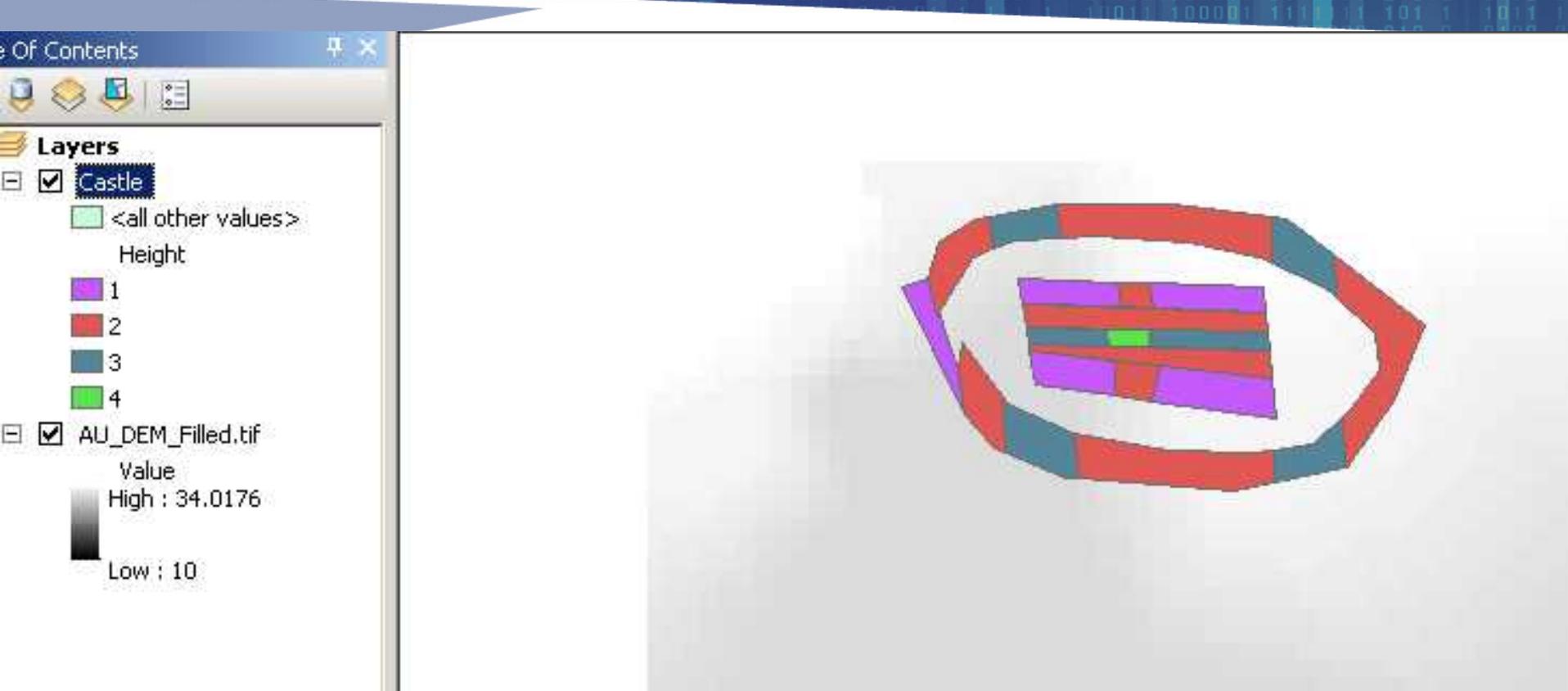
Vertically extends the features

# Extruding Features



Vertically extends the features

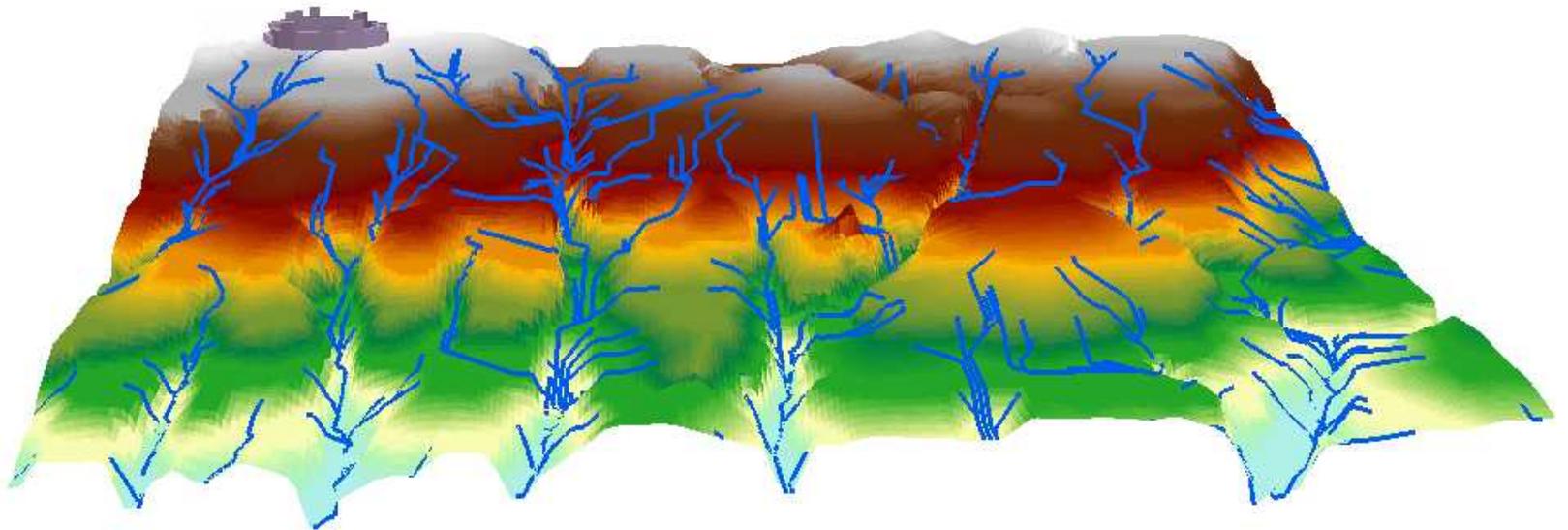
# Extruding Features by attribute



New shapefile with height field

# Extruding Features by attribute

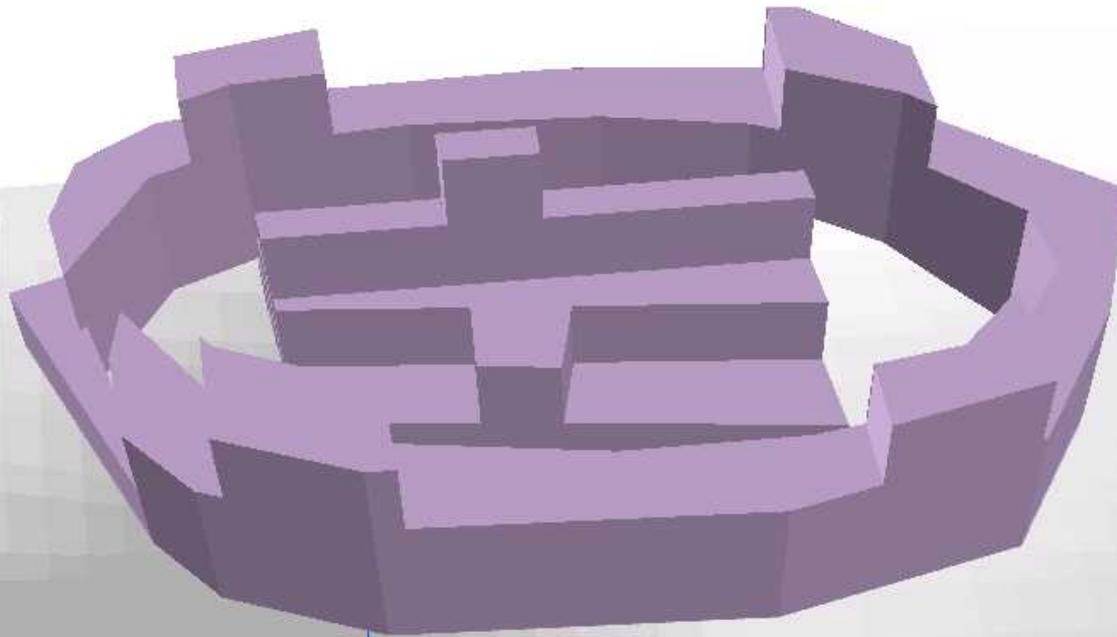
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New shapefile extruded by the height field

# Extruding Features by attribute

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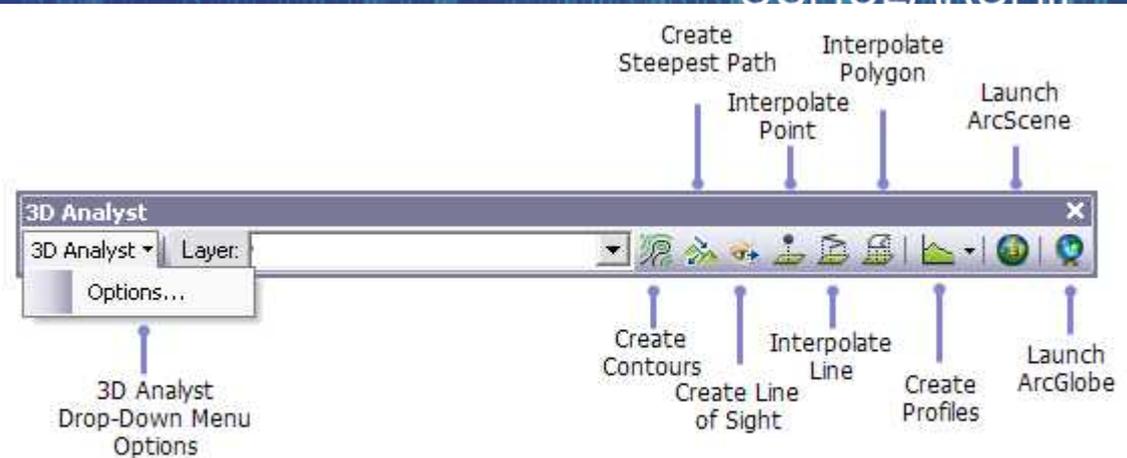
New shapefile extruded by the height field

3D visualization

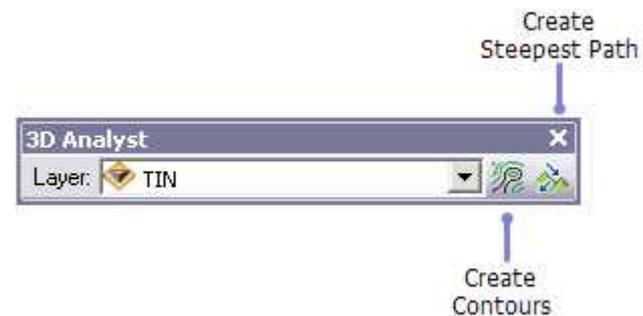
# ARCSCENE TOOLS

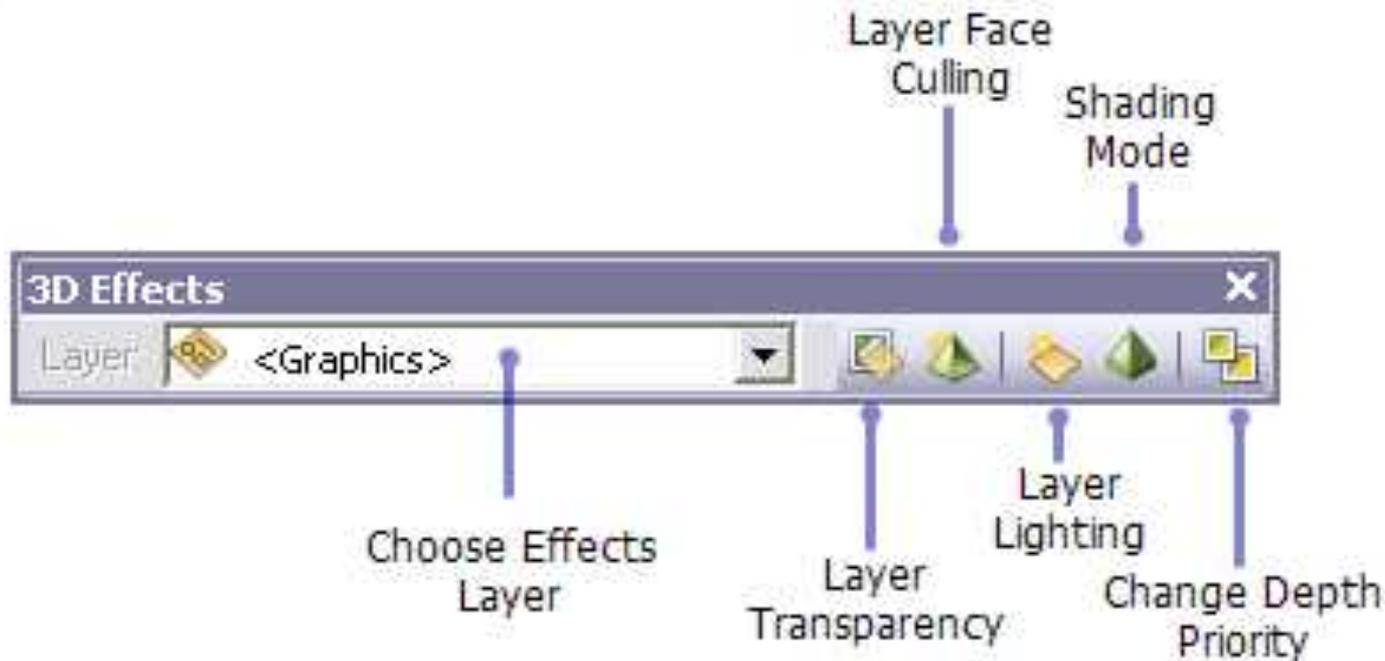
# 3d Analyst Toolbar

## In ArcMap (2d)



## In ArcScene (3d)





- Used to change how each layer is displayed

# Recording Animations

