DIGITAL MAPPING TECHNIQUES 2015

The following was presented at DMT'15
(May 17-20, 2015 - Utah Geological Survey,
Salt Lake City, UT)

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2015)

http://ngmdb.usgs.gov/info/dmt/

QGIS and three.js for visualizing and sharing 3D information in a web browser

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Introduction

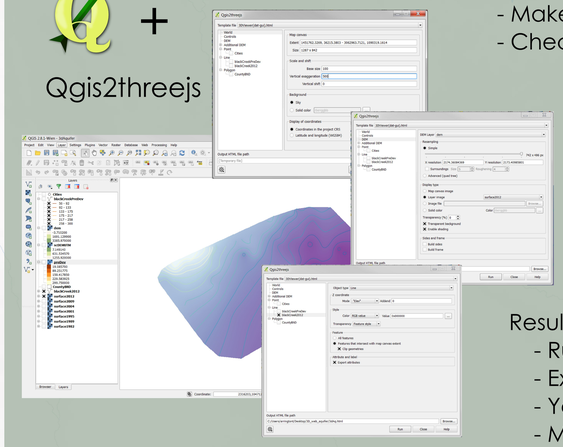
Technology for creating, visualizing, and sharing 3D information is continuing to develop toward 'user-friendliness'. Presenting information in 3D can be helpful for communicating geoscience. New advances in web browser technology, in this case Web Graphics Library (WebGL) and HTML5, make rendering interactive graphics in the web browser possible.

Three.js is a javascript library that makes use of WebGL technology for 3D graphics.

A plugin called **Qgis2threejs** was developed by Minoru Akagi for the open source GIS software QGIS. The plugin's easy to use GUI lets you easily export 3D visualizations from geodata in QGIS. It exports HTML and JS files that can be customized.

Workflow

Qgis2threejs



Prepare data in QGIS
- QGIS supported format for vector and raster data
- Symbolize data
- Make sure units and attributes are congruent
- Check for common coordinate systems

Use qgis2threejs plugin
- Choose basic "World" settings, like vertical exaggeration
- Select the primary surface under "DEM" tab.
  - Choose rendering and display settings
- Add additional surfaces
  - Choose rendering and display settings
- Select any vector features (points, lines, polygons)
  - Place on a surface, extrude based on attributes

Results
- Run the plugin
- Exports JavaScript and HTML file to folder and opens in browser
- You can save export options for future use
- Modify HTML for webpage, or dive in to three.js

Considerations

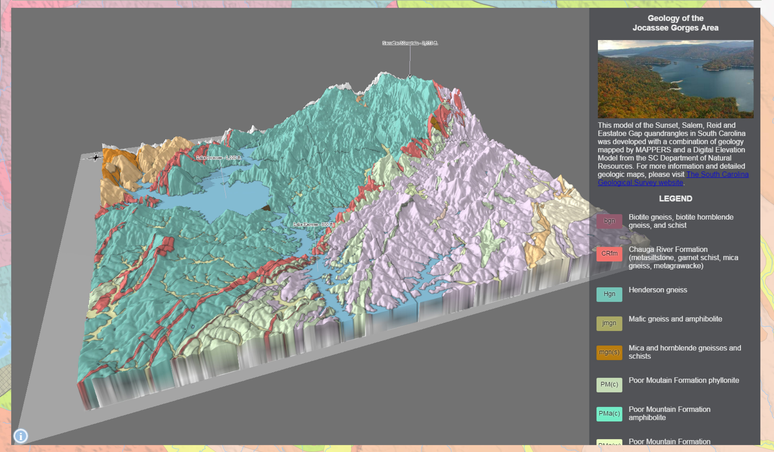
Browser Support
- Many of our website visitors don't have latest browsers
- Supply other options, such as static images

GIS Data format
- May take some work to get data in to QGIS
- Arc Geodatabases not fully supported in QGIS
- Familiarity with QGIS

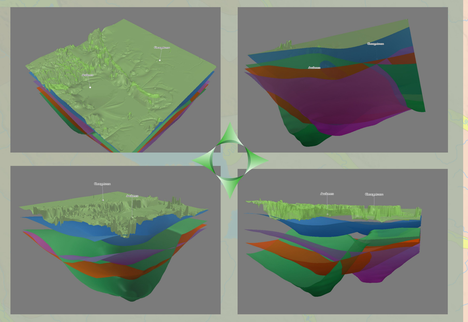
JavaScript familiarity and security

SCREENSHOTS - CHROME BROWSER

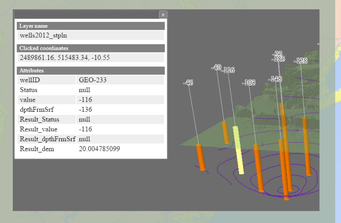
Geologic Map with exaggerated DEM



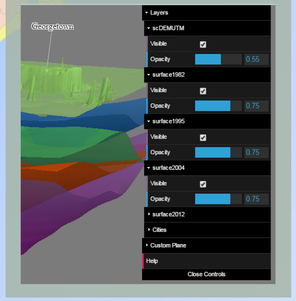
3D Navigation



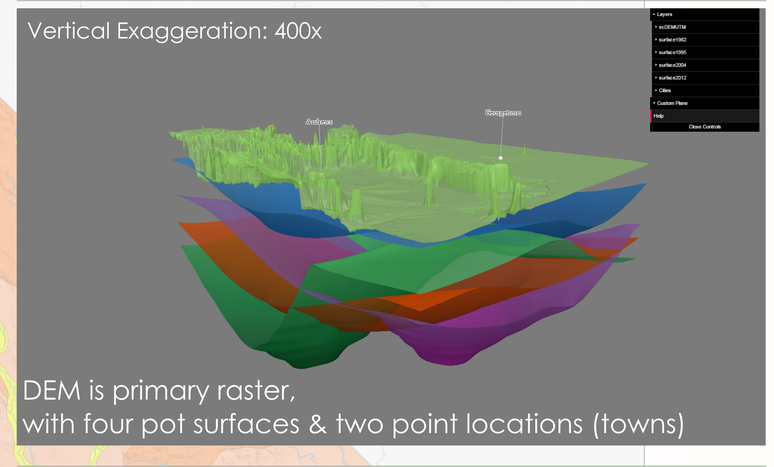
Query Raster & Vector Layers



Control Layer Visibility

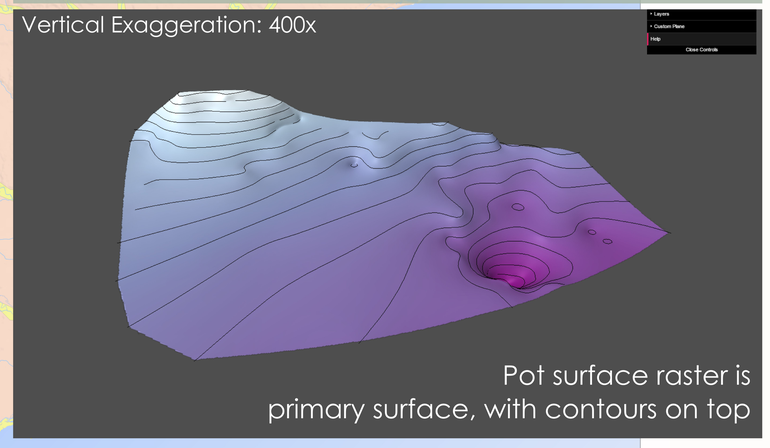


Cones of depression over multiple years



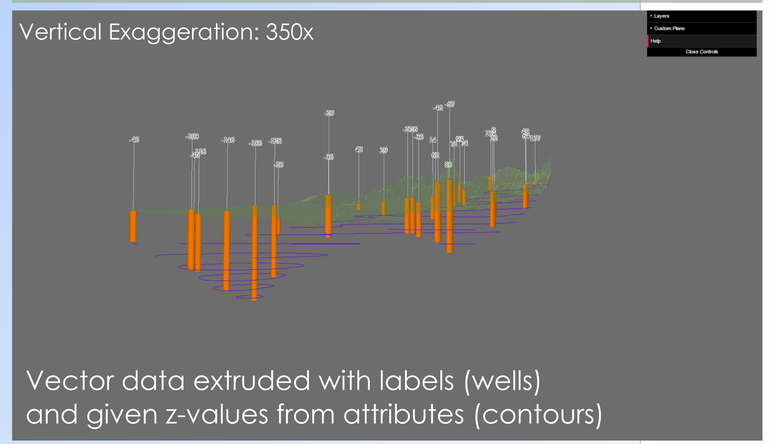
DEM is primary raster,
with four pot surfaces & two point locations (towns)

Potentiometric surface of Black Creek Aquifer



Pot surface raster is
primary surface, with contours on top

Wells extruded to potentiometric elevation



Vector data extruded with labels (wells)
and given z-values from attributes (contours)

NOTES:

QGIS is a free and open source GIS software. A plugin called 'qgis2threejs' was developed by Minoru Akagi that exports geodata from QGIS to your web browser for 3D visualization and interaction. The plugin can be downloaded through the QGIS plugin repository.

This poster is the result of some experimenting with QGIS and the qgis2threejs plugin. Data from the South Carolina Geological Survey and the Hydrology Section were used, including geologic map data draped over a DEM, potentiometric surface rasters and contours, and well locations with depth values.

There are many options for customizing the export from QGIS. Since the poster was presented at the DMT conference, the developer of the plugin has added more functionality that makes exporting geodata to interactive 3D web 'scenes' even easier.

Check out the plugin's github page for demos and more information:
https://github.com/minorua/Qgis2threejs

Do some experimenting on your own. QGIS and the qgis2threejs plugin are free.

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