

Creating geologic maps using Google Earth

This method for creating geologic maps in Google Earth starts with creating 3D orientation symbols that are positioned over the Google Earth terrain. We have developed a web-based Symbols tool that uploads a spreadsheet of point data for a field area and outputs a Google Earth KML file with field data points depicted as dots (for locations with no orientation data), strike and dip symbols (for planar orientation data), or arrows (for lineation data). The symbols can be color coded by unit/formation as desired.

There are two versions of the Symbols tool. The original version (v1) uploads a generic CSV spreadsheet file with point data and allows the user to assign headers to columns with Longitude, Latitude, Unit/Formation, Symbol Type, etc. This tool can be used for any field data downloaded from a mapping app, which has been converted to a CSV file. The tool can be found here:

<https://educ.jmu.edu/~whitmesj/GEODE/symbols/>

The newer version (v2) of the Symbols tool, Symbols for StraboSpot, takes an XLS file downloaded from StraboSpot.org as the input file for generating 3D orientation symbols for Google Earth. The StraboSpot Symbols tool can be found here:

<https://educ.jmu.edu/~whitmesj/GEODE/symbols2/>

Once you have created a Google Earth KML file with your field data highlighted as oriented symbols, you can progress to building your geologic map in Google Earth.

Making a geologic map in Google Earth



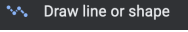
In Google Earth open the KML file that you created with the Symbols tool. You can use either the web version of Google Earth (<https://earth.google.com/web/>) or the desktop version of Google Earth Pro, if you have it installed on your computer. In the web version of Google Earth, you can load your KML file(s) with symbology by clicking on the icon with 3 horizontal lines in the top left corner of the window, and then clicking on "Projects". Choose "Open", and then "Import KML file from computer". On the desktop version of Google Earth Pro, you can open your KML file from the "Open" option in the File menu at the top of the screen. When your KML file(s) with symbology are loaded in Google Earth, you should see a group of colored strike and dip symbols (or dots) oriented in 3D space above the Google Earth ground surface. Clicking on a symbol will open a pop-up balloon with information that you recorded about that outcrop.

Additional outcrop information, such as field photos, can be added to a pop-up balloon for a symbol by editing the symbol (i.e. the Placemark) in Google Earth Pro. Additional text can be added directly in the Description field. To include images, add the following text snippet to the Description field:

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<br><br></img><br>
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Imagery added in Google Earth Pro will appear when the symbol is clicked in either Google Earth Pro or the web version of Google Earth. However, images that are

uploaded using the web version of Google Earth are stored differently on the Google servers, and will not display correctly in Google Earth Pro.

To create a geologic map in Google Earth Pro (desktop), use the Path  and the Polygon  tools to create lines (i.e. contacts, faults) and unit regions, respectively, to fill the mapping area. In web Google Earth, you can find these tools in the Projects menu by clicking on the blue “New Feature” button and selecting “Draw line or shape”: . In web Google Earth, when a drawn line terminates at its starting point (i.e. closes a loop or region) a polygon is created. Keep in mind that contacts are typically drawn as black lines and faults as thicker black or red lines. Polygons (for the areal regions of units) can be colored by unit (typically matching the colors of the orientation symbols) and made semi-transparent so that the aerial imagery can be seen under the colored polygons. The full mapping region (field area) should be filled with colored unit polygons, with contacts and/or faults highlighted.

Map elements can be organized by putting all created lines and polygons in a single folder in the Temporary Places folder for Google Earth Pro (desktop). In web Google Earth, create a folder by clicking on the blue “New feature” box, and then put lines and polygons in that folder. To save a map in Google Earth Pro (desktop), select the folder containing the lines and polygons, go to the File -> Save menu, and choose “Save Place As”. In web Google Earth, click on the 3 vertical dots icon in the upper right corner of the Projects menu and click on “Export as KML file”.

In desktop Google Earth Pro, the final geologic map can be saved as an image, by going to the File -> Save menu and choosing “Image”. Several options are available to customize the map image, such as including a title, scale, north arrow, and/or a legend as desired. The view in the Google Earth window can be zoomed and/or rotated to the best perspective to show the full map prior to saving the image. In web Google Earth, the only option for saving a geologic map image is to take a screen capture of the final map and save it as an image file. In either version of Google Earth, it will likely require several iterations to obtain the most aesthetic or professional version of a final map image.

Feel free to contact Steve Whitmeyer (whitmesj@jmu.edu) with any questions or suggestions.