Tilt Derivative "tilt_calc3" Script
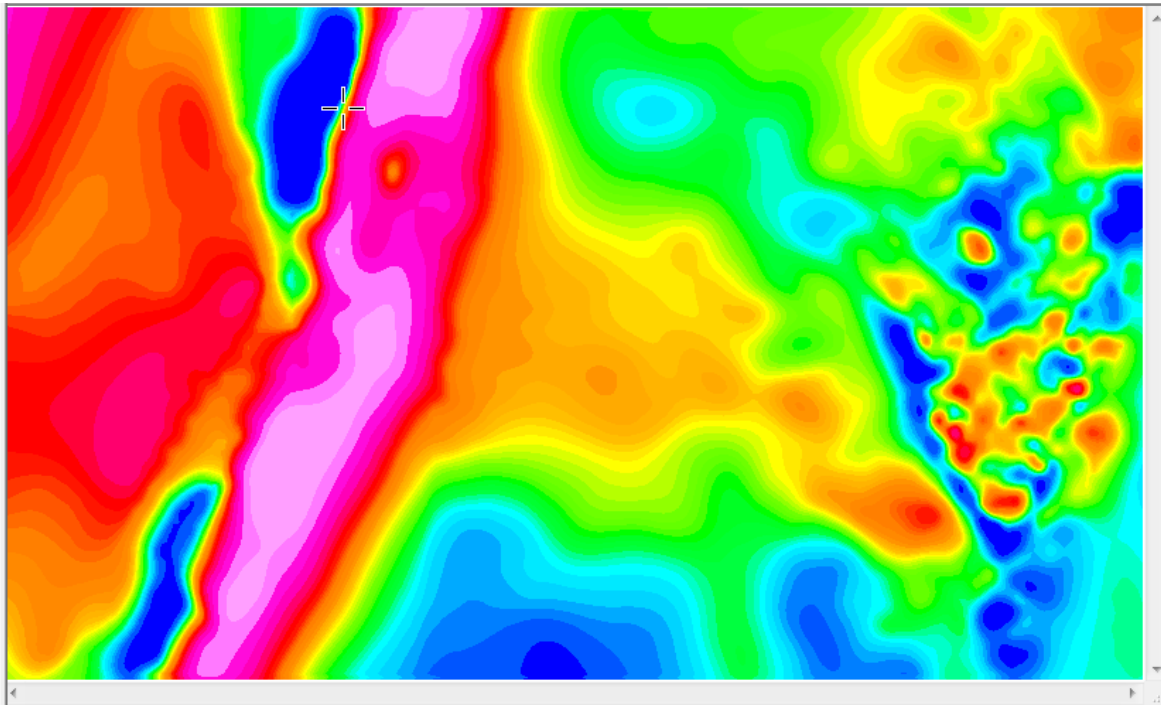
This script takes advantage of the derivation by Rick Blakely (see attached easy_tilt.pdf) that shows that 1/tilt_HD = depth-to-source along the zero contour of the tilt derivative. Remember that the input grid needs to be RTP.

The script does the following:

- Calculate the tilt derivative (θ) and horizontal gradient of the tilt derivative ($d\theta/dh$) using the MagMap tiltdrv.gx
- Display θ using a grayscale zone file (tilt2.zon) that colors the grid between +/- 0.4636476 radians (i.e., +/- $\tan^{-1}$ (1/2) for z/2) gray and everything else white
- Draw the zero contour on the grayscale map
- Export the contour to a shape file
- Import the shape file into a GDB named "pts_tilt0_lnz_Shapes.gdb". The other gdb created ("pts.gdb") can be deleted.
- Re-fid the points in the GDB to their "nominal" distance to reduce gaps
- Sample the $d\theta/dh$ grid along the zero contour
- Run a database math expression to calculate a depth channel =1/ $d\theta/dh$

Exporting the contours to a shape file is the only way I could find to get the contour location into a GDB. This process could be cleaned up significantly with a small amount of developer time. Note that the "Depth" channel is the depth below the flight elevation.

The maps below show an example of this script run on the Warner Valley magnetic data.
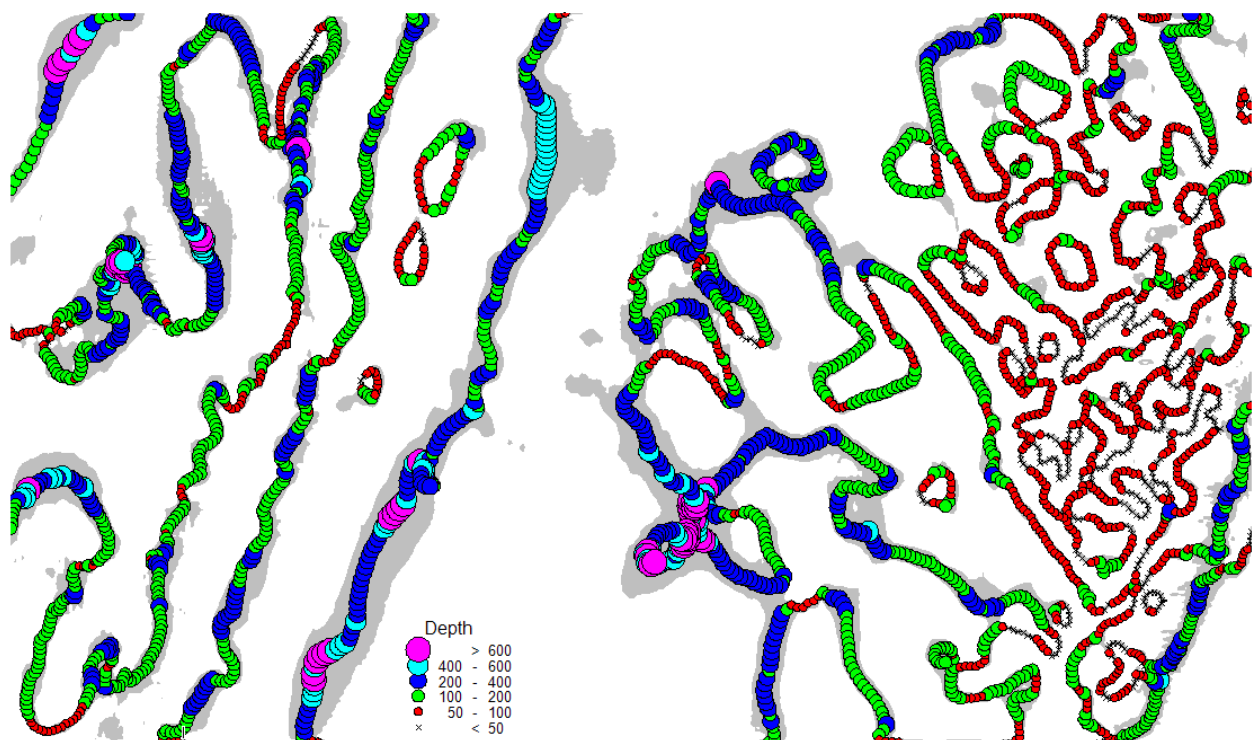

Input magnetic anomaly grid

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Output GDB with calculated depths

Depth
- ● > 600
- ● 400 - 600
- ● 200 - 400
- ● 100 - 200
- ● 50 - 100
- × < 50

Grayscale map produced by script with depth locations from gdb manually plotted as proportional symbols

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