

## Creating an ARC shape file and plotting arrows to represent the magnitude and flow direction in ARCMAP.

How flow direction (angles) were calculated:


- I calculated the angles (flow direction) in Microsoft EXCEL spreadsheet using the following equation:

$$=\text{degrees}(\text{ATAN 2} (v_x, v_y))$$

How to create an ARC shapefile:

- In ARCMAP click on the + (add data) icon ([NovDec\\_200X.txt](#))
- Right click on the file name to pull up a menu. Select "Display X,Y Data" to create an \*.events file ([NovDec\\_200X.events](#))
- Right click on the \*.events file to pull up a menu. Select "Data->Export Data (as a shapefile)". ([output\\_name.shp](#))

How to plot the arrows to indicate magnitude (length) and angle (flow direction):

- Double left click on the shape file to bring up the 'Layer Properties' dialog.
- Show selection box: Quantities -> Graduated Symbols
- Fields: Value choose mag
- Advanced -> Rotation. Rotate Points by Angle in this field: choose angles. Click on Arithmetic to select the correct grid orientation
- Template -> Properties -> Type -> choose Character Marker Symbol.
- Font -> ESRI Dimensioning.
- Click on the upward pointing arrow 
- Click OKAY, OKAY, OKAY

Note: the sampling size will most likely have to be increased. You can do that by clicking on the 'Classify' button and then on the 'Sampling' button and then increase the maximum sampling size.

I would also increase the number of classes from the default 5 to 8 or greater.

You can also change the Symbol Size from 4 to 18 (default) to something that will better scale the arrows for display purposes.

Magnitudes are given in meters/year

Orientation relative to Grid North

Polar stereographic Projection

WGS 84 ellipsoid