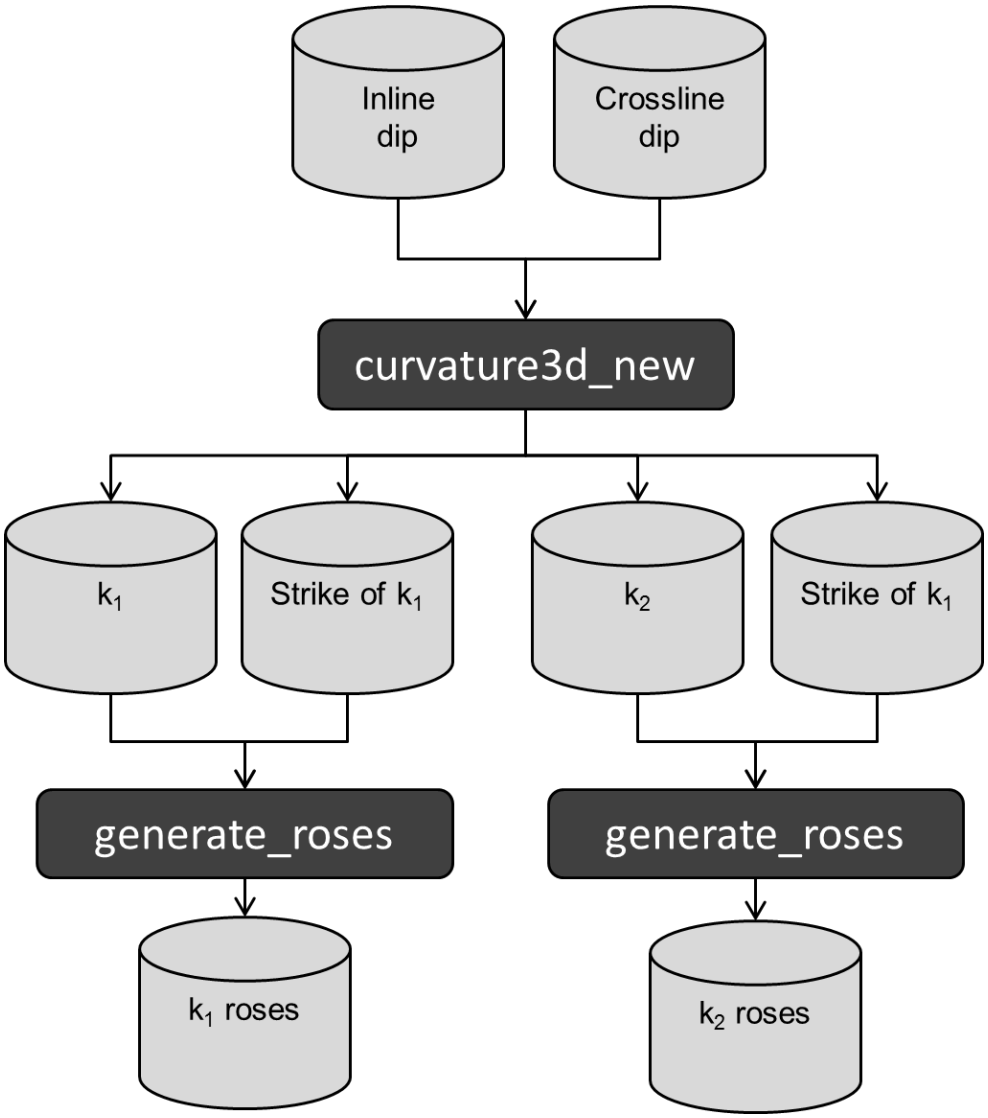
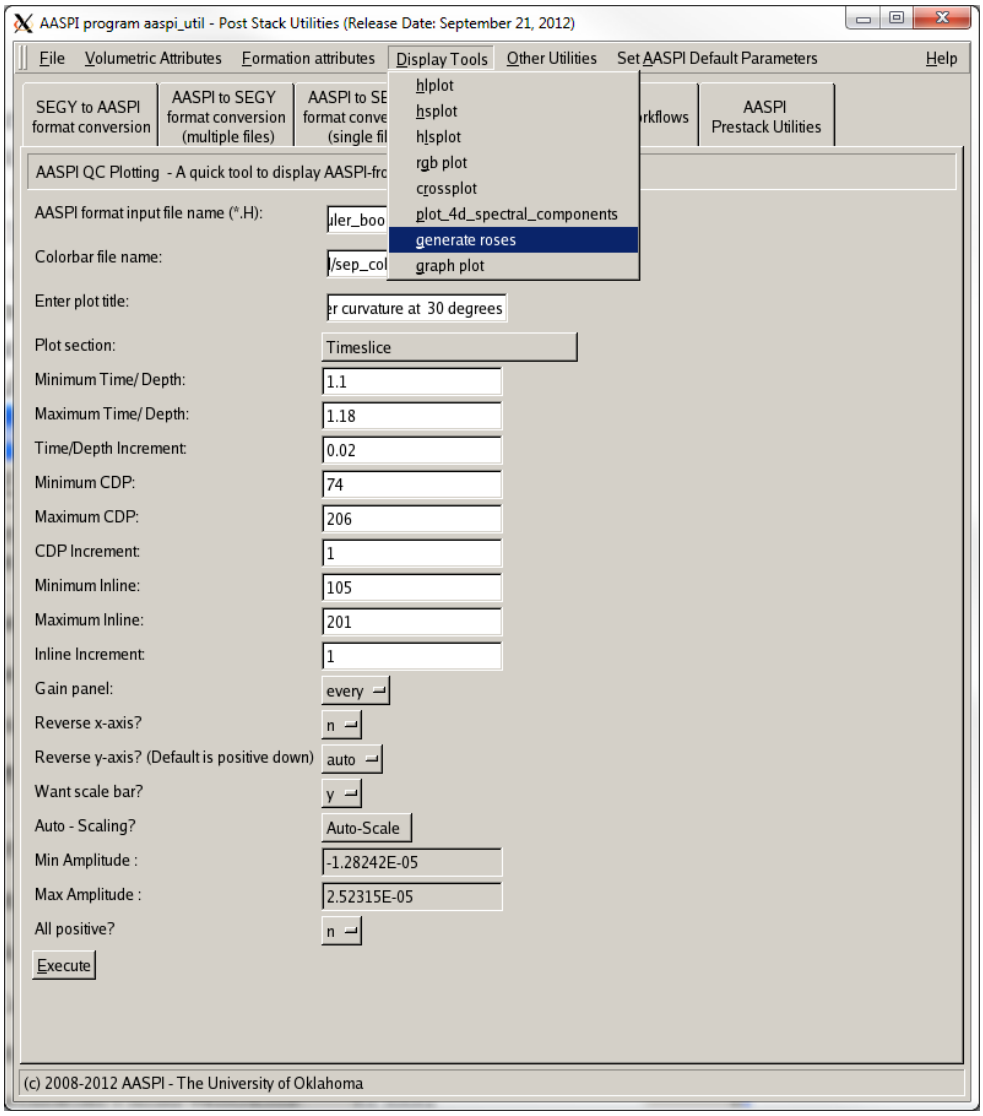
GENERATING VOLUMETRIC ROSE DIAGRAMS – Program generate_roses

Computation flow chart

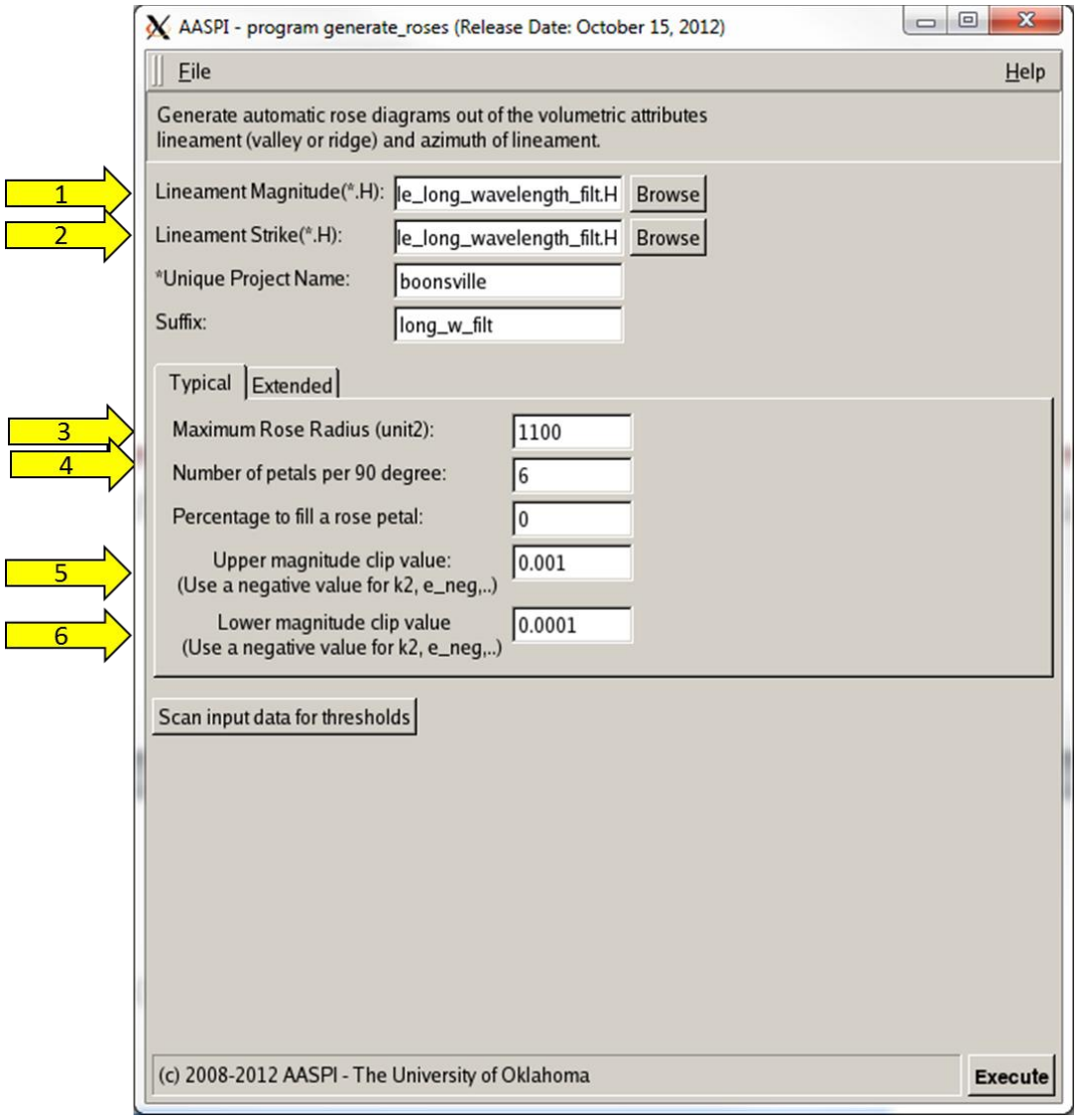


Computing rose diagrams

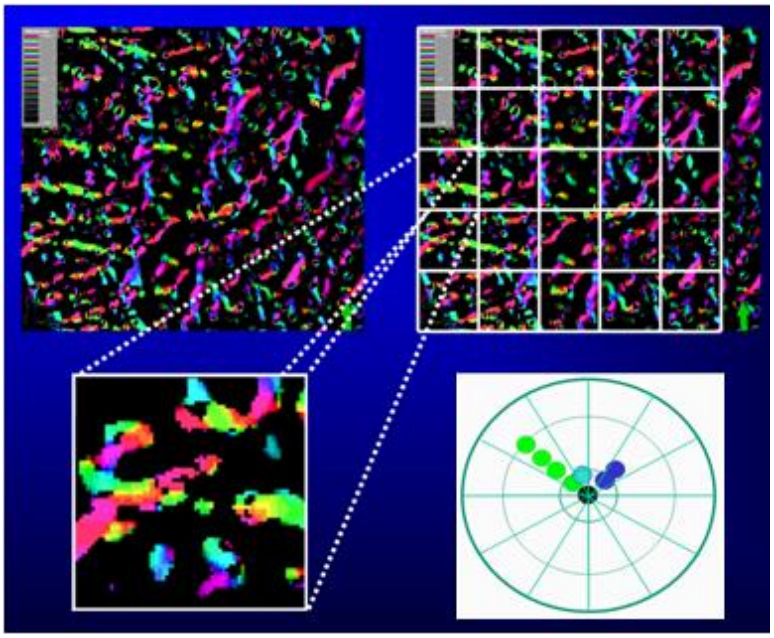
To generate rose diagrams, we invoke the program **generate_roses** under the *Display tools* tab:



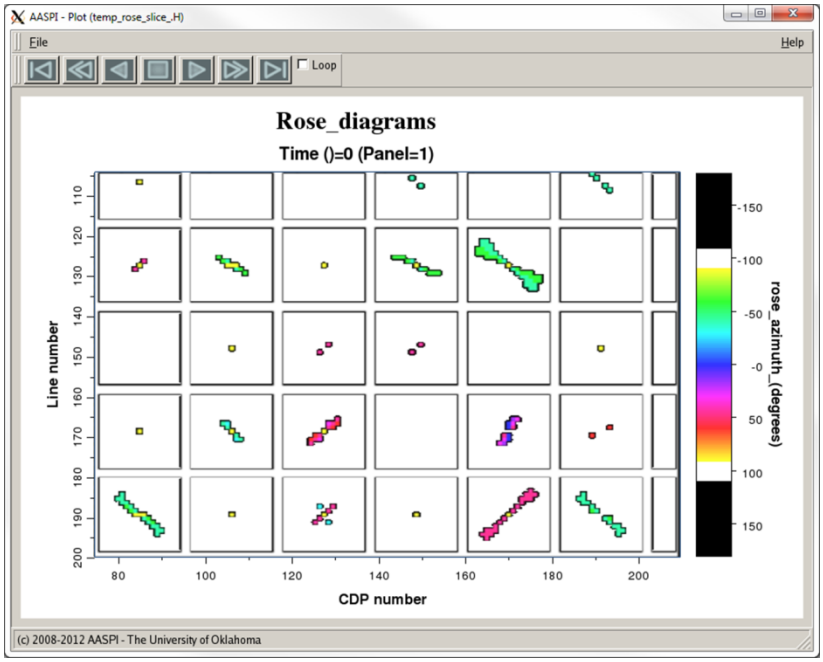
In the GUI below, (1) set the *Lineament Magnitude* to be *k_valley_boonsville_long_w_filt.H*, and (2) the *Lineament Azimuth* to be k_*min_azim_ boonsville_long_w_filt.H.* The default (3) *Number of petals per 90 degree* is 6 resulting in 15^0- petals. Set the (4) *Maximum Rose Radius (unit2)* to be 1100 ft (or 21 bins by 21 bins for our 110 ft b y 110 ft bin size). Generating a rose diagram has some image processing components to it. To avoid dominating the calculation by one or two large events within the window, we (5) clip the very largest values to a value of *Magnitude Upper Threshold*. We do not count any low amplitude lineaments whose value is less than (6) *Magnitude Lower Threshold*.



The figure from Mai et al. (2009) describes the process. The attribute volume is first broken into a suite of non-overlapping rectangular analysis windows for every time slice. Within each window each voxel is examined. First, the proper rose petal is computed from the azimuth of minimum curvature volume. Then the value of the lineament is compared against the upper and lower threshold. The resulting (perhaps clipped or zero) value is then added into the appropriate rose petal. The process is repeated for all the voxels within the analysis window.



The results for our Boonsville survey time slice looks like the image below:



The lineament values range between -90 and +90. The black areas outside the roses have been set to non-realizable values of either -180 or +180. The white area analysis window boundaries have been set to values of +/-100. In this manner, the rose diagrams can be converted to SEGY format, loaded into your interpretation workstation, and by making values greater than 90^0 or less than -90^0 transparent, can be co-rendered with your seismic data or other attribute.