

This CD contains MATLAB scripts written by Ryan Cross, at the Geophysical Institute, University of Alaska Fairbanks, USA. Many of these scripts were developed as part of a Masters program in Geophysics.

Note that the file name abbreviation Una stands for Unalaska and more appropriately refers to the Fox Islands region, and Shm stands for Shumagin and more appropriately refers to the Alaska Peninsula.

The file directories are broken down as follows:

/AK\_Pen

-- Contains files for use in elastic dislocation modeling of data from the Alaska Peninsula

/Andreanof

-- Contains files for use in elastic dislocation modeling of data from the Andreanof region of the central Aleutians

/Fox\_Islands

-- Contains files for use in elastic dislocation modeling of data from the Fox Islands region, eastern Aleutians

/Near\_Islands

-- Contains files for use in elastic dislocation modeling of data from the Near Islands region, western Aleutians

Within each of these directories listed above are six important files:

“file\_name”.m (ex Andreanof.m)

This is the main script, it imports .horzvel, .vertvel, and .slipmodel, and solves for coupling on the fault planes, and an arc translation velocity. Within the first few lines of the script are some adjustable parameters. “P” controls the density of the grid search (set at 50 for good results, but this takes a few minutes to run), “ARCvec” controls the range of the grid search, “lb”, and “up” set the lower and upper bounds for the inversion. More information about adjusting these parameters is written within the script. At the end of this script is the option to write out the modeled velocities and arc translation velocity for use in GMT.

.horzvel

Horizontal velocities of sites used in main script (ex And.horzvel). Columns are as follows: (1) decimal degree longitude, (2) decimal degree latitude, (3) East velocity in (cm/yr), (4) North velocity in (cm/yr), (5) East uncertainty in (cm/yr), (6) North uncertainty (cm/yr), (7) correlation between horizontal uncertainties, (8) station names. Note that the .horzvel and .vertvel files must have the same number of rows (i.e. same site must be listed in the same order in both files).

.vertvel

Vertical velocities of sites used in main script for the given region (ex And.vertvel). Columns are as follows: (1) decimal degree longitude, (2) decimal degree latitude, (3) zeros, (4) Vertical velocity in (cm/yr), (5) zeros, (6) Vertical uncertainty (cm/yr), (7) zeros, (8) station names. Note that the .horzvel and .vertvel files must have the same number of rows

.slipmodel

Fault plane model geometry for the given region (ex And.slipmodel). Columns are as follows: (1) decimal degree longitude for the southeastern most corner of the fault plane, (2) decimal degree latitude for the southeastern most corner of the fault plane, (3) Length of the fault plane in kilometers, (4) Width of the fault plane in kilometers, (5) Dip of the fault plane in degrees, measured from horizontal, (6) Strike of the fault plane measured in direction such that the dip direction is always “down to the right” when facing in the strike direction, (7) Depth to the top of the fault plane in kilometers.

subduction.m

Subroutine for the main script. This script runs the dislocation program “disloc3d” and inverts for the coupling on the fault planes using the MATLAB script “lsqlin”. This script also calculates the chi squared value. This script is called many times (as many times as the grid search requires).

pathdef.m

Sets the path to find other scripts needed. \* You must make sure that at least one path is pointed at the “Other\_needed\_scripts” directory contained on this CD or copied to your computer\*.

islands

Very simple file that contains coastlines in the local (east, north, up) coordinate system (only used for plotting, not critical)

trench

Some directories contain the file trench, this is the trench location in the local coordinate system it is only used for plotting and is not critical.

Other directories on the CD include

/Bering\_plate

-- contains files for calculating the Euler pole for the Bering plate

The main scrip in this directory is Bering\_euler\_inversion.m

Within the script you can add and remove different sub regions by removing and adding there abbreviated file names (‘Shm’ for Alaska Peninsula, ‘Una’ for Fox Islands region, ‘And’ for Andreanof Islands region, and ‘Ber’ for Bering plate interior sites).

This script give the Euler pole location in Lat and long and angular speed (deg/my) as well the earth centered Cartesian version of the pole. The pole covariance matrix is also calculated. The velocities of the plate predicted by the pole are calculated and written for use in GMT using the script save\_gmtvec. The chi squared value is also calculated.

??\_arcvel\_horz.gmt

These three files where “??” is replace with the three letter region abbreviation are the arc translation velocities and uncertainties used for calculating the Bering plate Euler pole. Columns are the same as the .horzvel files described above.

Ber.horzvel

Bering plate interior sites velocities. Columns are the same as the .horzvel files described above.

pathdef.m

Same as described above

One final directory

/Other\_needed\_scripts

-- Contains other scripts written by a variety of researchers, which are needed to run the scripts written by Ryan Cross found in the other the directories.