

Lin, F.-C., Ritzwoller, M. H., Yang, Y., Moschetti, M. P., & Fouch, M. J. (2010). Complex and variable crustal and uppermost mantle seismic anisotropy in the western United States. *Nature Geoscience*, 4(1), 55-61. Nature Publishing Group. doi:10.1038/ngeo1036

Properties:

Location: US west of 110°W longitude

Grid: 0.5°x0.5°

Stations: TA

Ambient noise: Oct 2004 - Oct 2008 (611 stations)

Earthquakes: 574 earthquakes, Ms>5.0, 1/06-1/09

Tomography:

Ambient noise: ray theory (eikonal tomography, Lin et al., 2009), 12-46 s

Earthquakes: ray theory (eikonal tomography, Lin et al., 2009), 24-54 s

Parameterization:

Isotropic Vs: from Moschetti et al., (2010)

Azimuthal anisotropy (2ψ): 1 crustal (Layers 2&3) and 1 mantle layer (80 km thick region)

Inversion: Monte Carlo model space sampling.

Forward code: based on Herrmann

Moho: from Moschetti et al. (2010)

Format of model file:

The model is found in a file called: lf_c_m1_m2_azi_ani_all.txt. Each line of the file has 7 entries:

lon	longitude
lat	latitude
azi_ani_crust_amp	amplitude of crustal anisotropy (%)
azi_ani_crust_psi	fast axis direction of crustal anisotropy (deg)
azi_ani_mantle_amp	amplitude of mantle anisotropy (%)
azi_ani_mantle_psi	fast axis direction of mantle anisotropy (deg)
azi_ani_lower_upper_mantle_psi	fast axis dir. of asthenospheric anisotropy (deg)

The model should be seen as an augmentation to the radial anisotropy model of the crustal and uppermost mantle by Moschetti et al. (2010). Anisotropy is in V_{sv} . Anisotropy directions are presented in degrees clockwise from North. The crustal anisotropy is contained in the lower two crustal layers in the crustal parameterization described by Moschetti et al. (2010):

Moschetti, M.P., M.H. Ritzwoller, F.C. Lin, and Y. Yang, Crustal shear velocity structure of the western US inferred from ambient noise and earthquake data, *J. Geophys. Res.*, 115, B10306, doi:10.1029/2010JB007448, 2010.

The first several lines of the file are the following:

```
235.8 42 2.8172 55.6593 2.6058 41.8777 51
235.8 42.2 3.3916 52.0673 2.4392 44.8418 51
235.8 42.4 3.1458 49.188 2.2014 54.3716 51
235.8 42.6 4.1364 61.4963 1.7232 40.6377 55
```

235.8	42.8	3.8284	59.3377	1.7656	49.345	55
235.8	43	2.6462	53.8237	1.9992	65.1478	59
235.8	43.2	3.0732	63.3372	1.6774	56.8612	59
235.8	43.4	3.8278	72.2982	1.6822	40.4783	59
235.8	43.6	4.4904	76.8177	1.4816	44.2789	63
235.8	47.2	4.6092	72.6885	1.2206	-79.4103	53
235.8	47.4	3.938	71.2058	1.1316	-79.2615	51
235.8	47.6	4.3024	70.0229	1.1406	-75.4048	51
235.8	47.8	5.7286	62.4102	1.3618	-67.9817	51
236	41.8	1.8804	54.9347	2.8338	52.0884	51
236	42	2.2394	55.3631	3.0568	50.328	51
236	42.2	2.0168	50.6878	3.0108	51.9151	51

Mantle anisotropy extends from Moho to 100 km depth. The direction of anisotropy in the asthenosphere is added to improve fit to SKS splitting data.