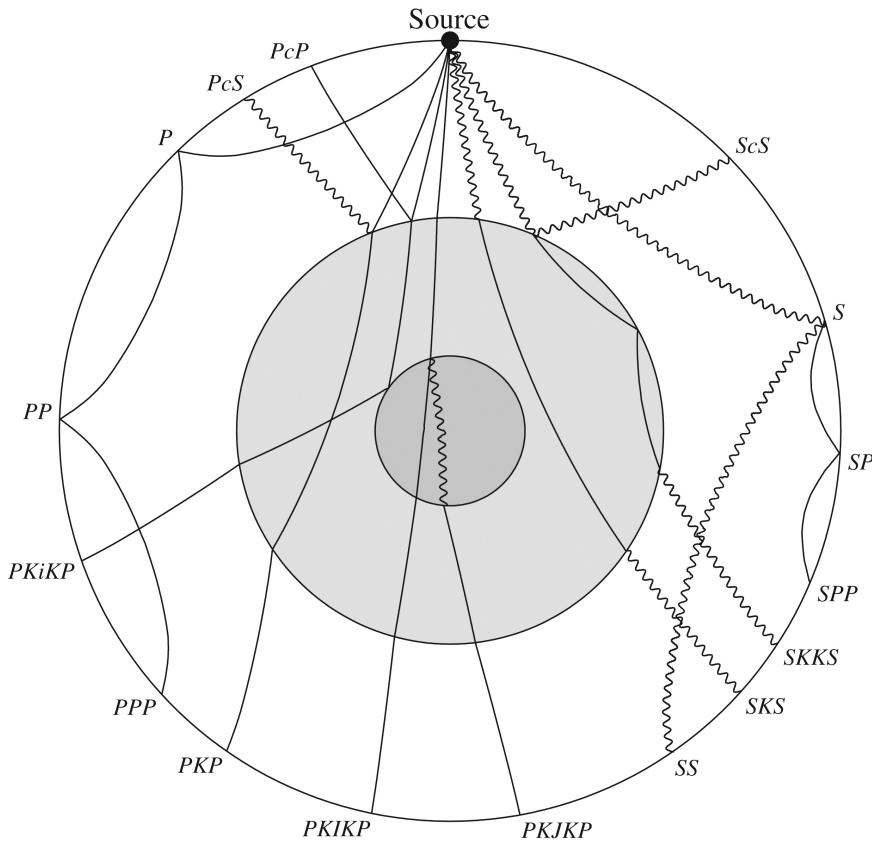


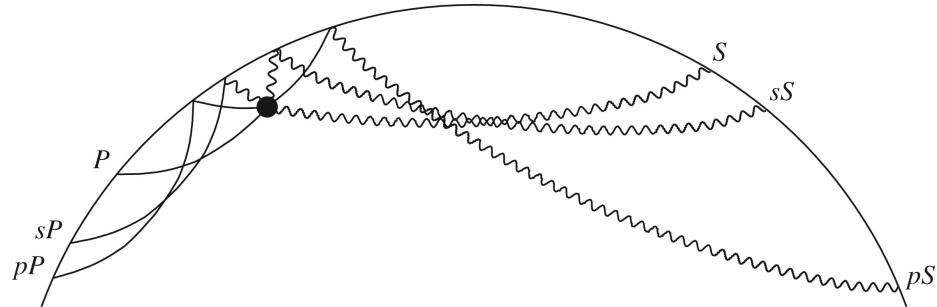
8. Global seismology

M. Ravasi | ERSE 210 Seismology

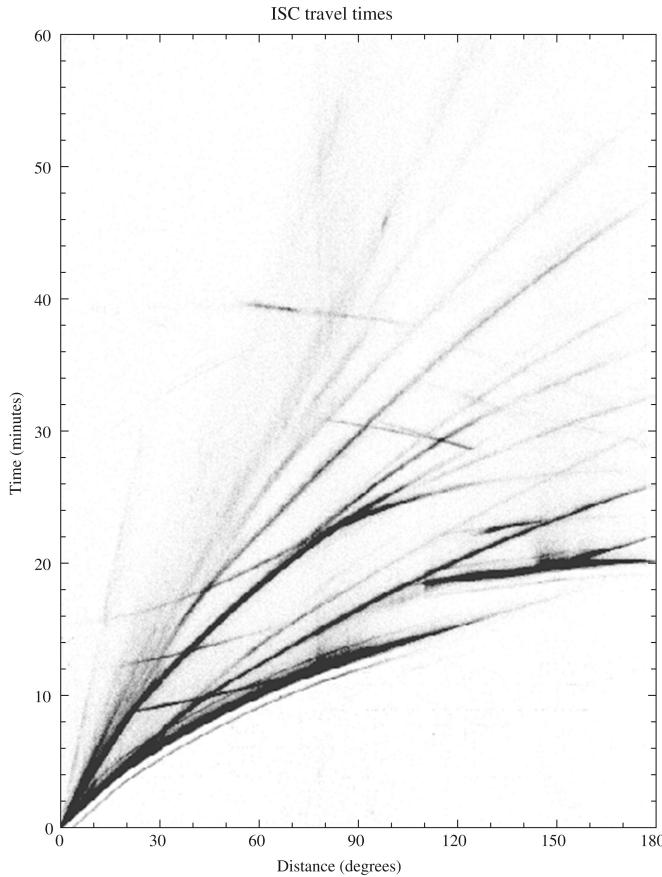
Rays in the Earth



Deep Earthquakes

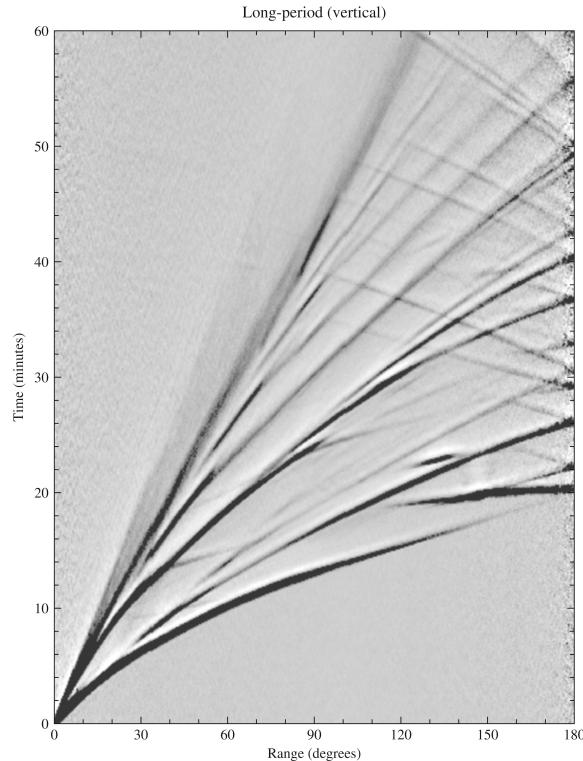
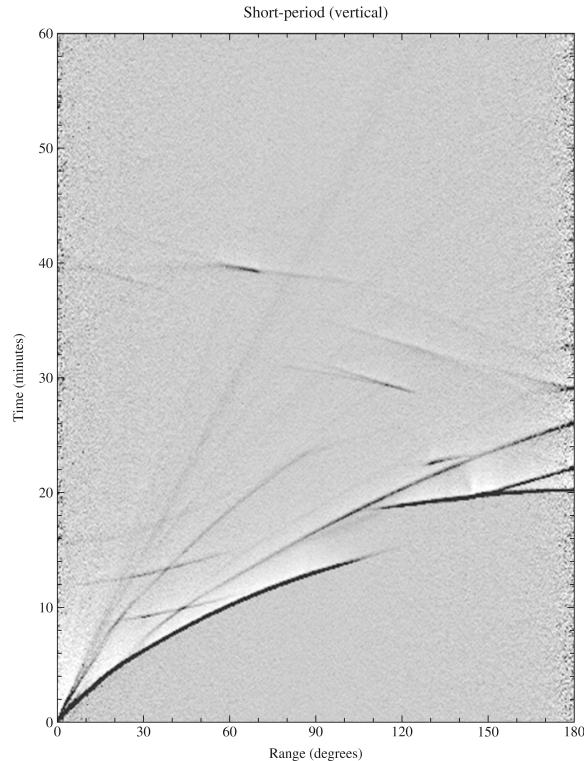


ISC traveltimes



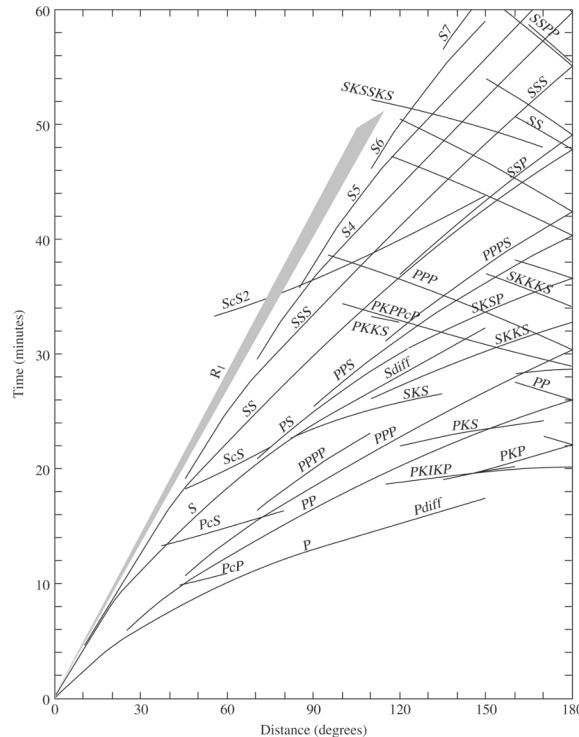
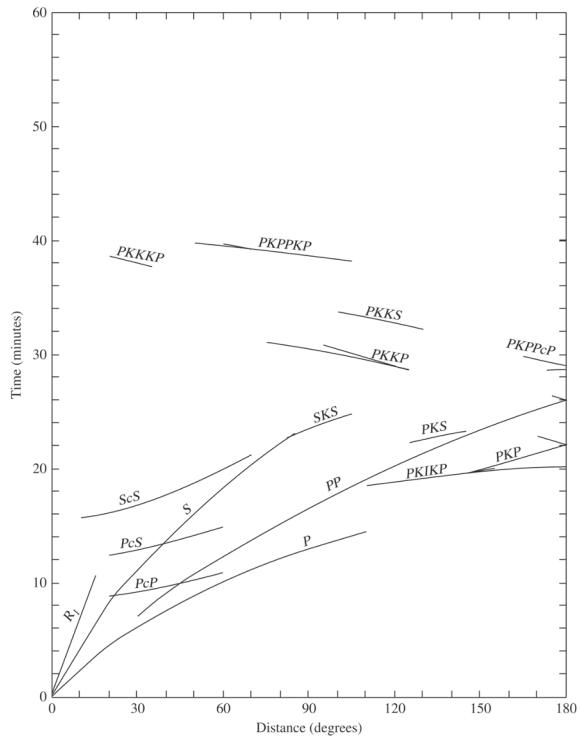
5M picks from 64 to 87

Seismogram stacks



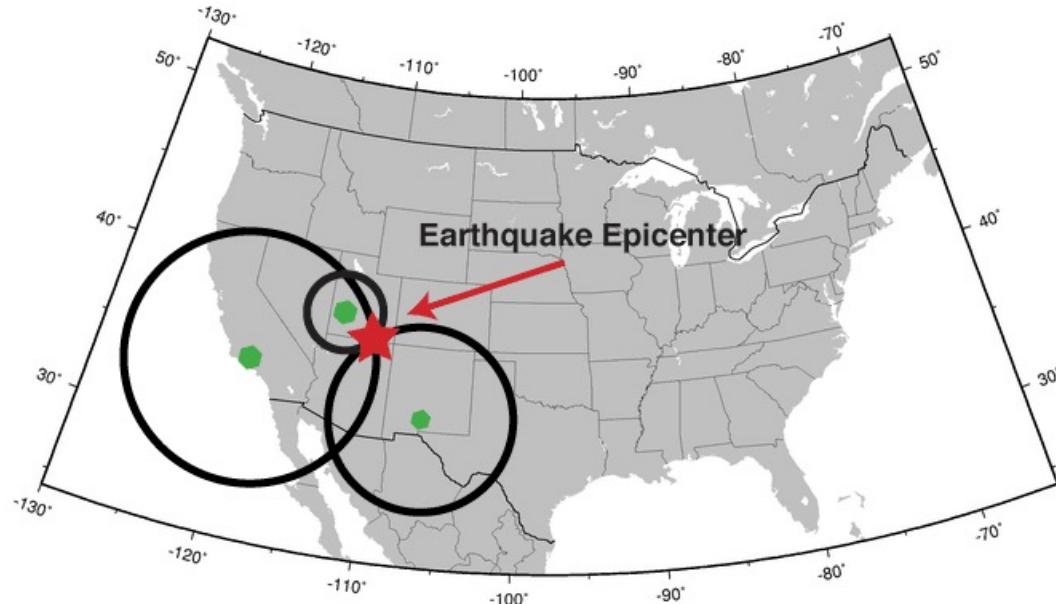
100k seismogram stacks between 88 and 94 (Earthquakes > 5.7

Seismogram stacks

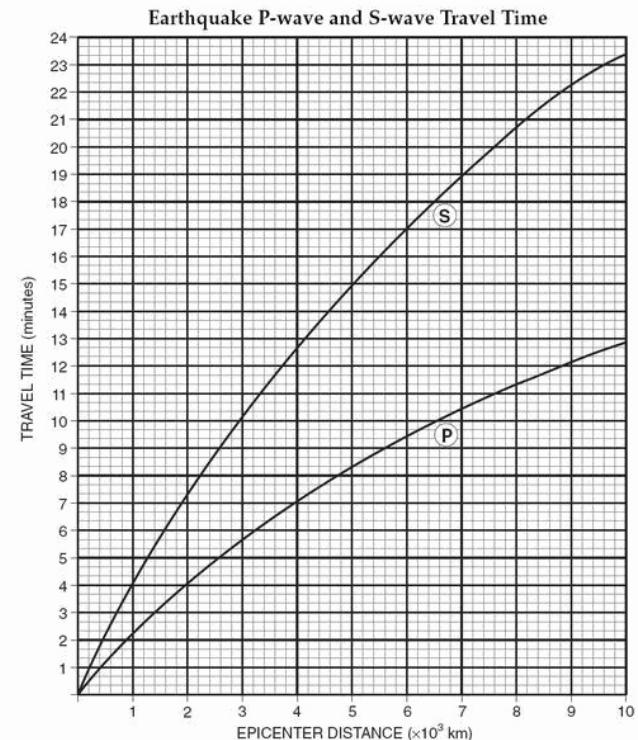


Analytical traveltimes as comparison

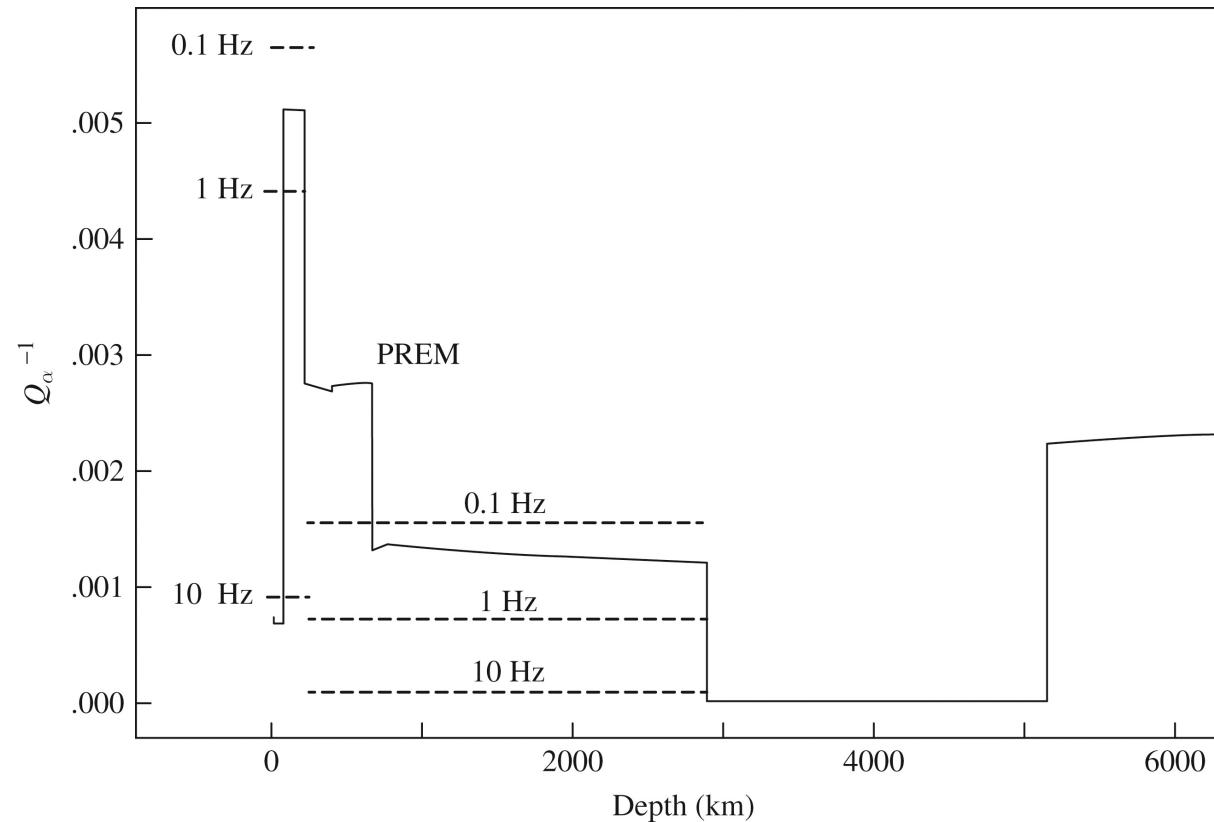
Earthquake location - epicenter



Triangulation



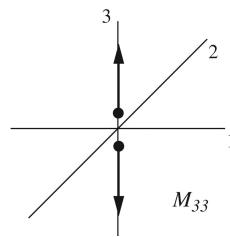
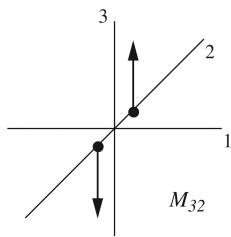
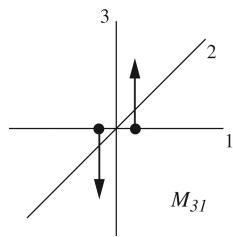
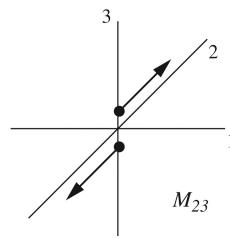
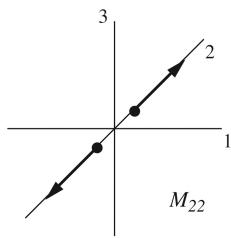
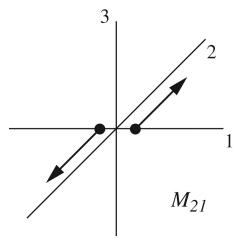
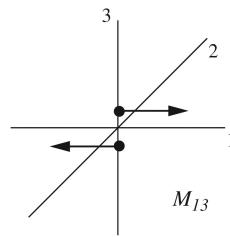
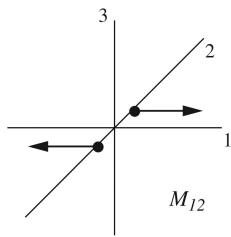
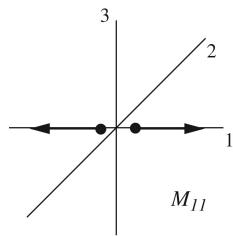
Attenuation in the Earth



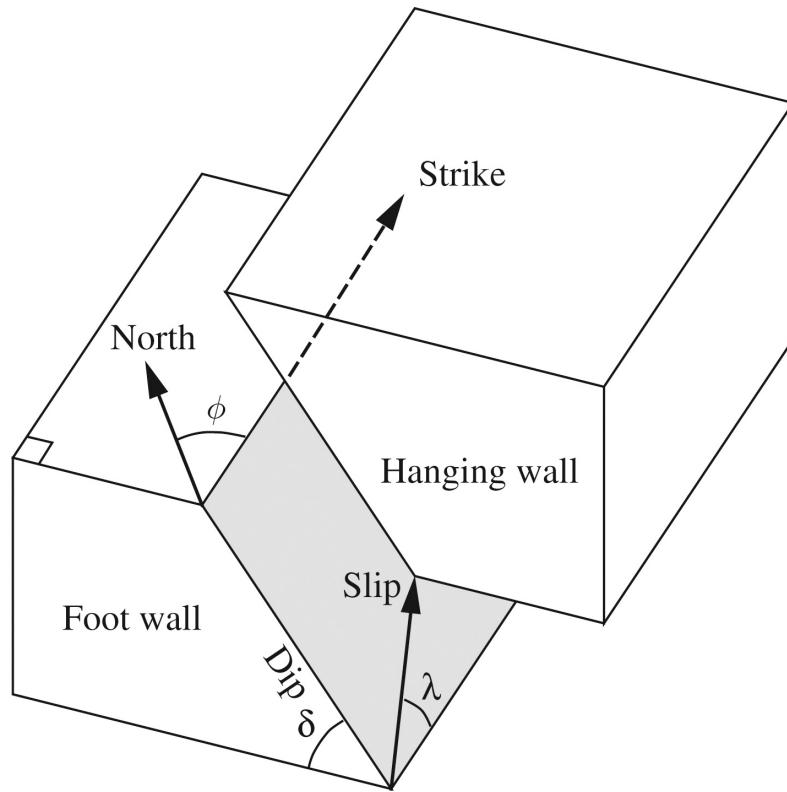
Seismic representation equation

$$u_i(\mathbf{x}, t) = G_{ij}(\mathbf{x}, t; \mathbf{x}_0, t_0) * f_j(\mathbf{x}_0, t_0)$$

Force sources

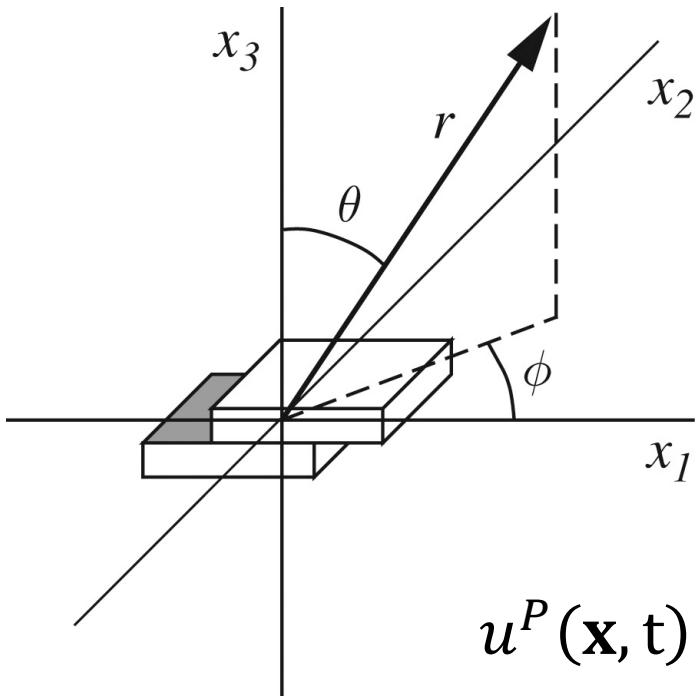


Earthquake faults



- Dip
- Strike
- Slip

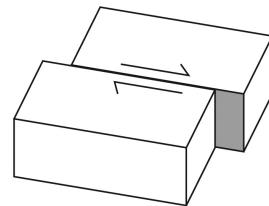
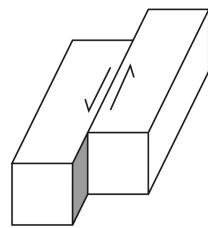
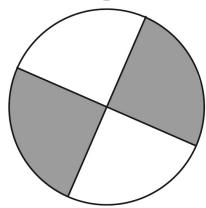
Source radiation pattern



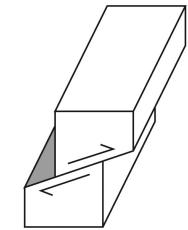
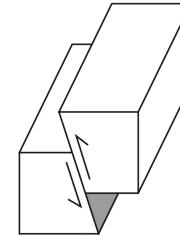
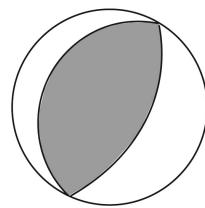
$$u^P(\mathbf{x}, t) = \frac{1}{4\pi\rho\alpha^3} \sin 2\theta \cos \phi \frac{1}{r} \dot{M}_0 \left(t - \frac{r}{\alpha} \right) \mathbf{i}_r$$

Focal mechanisms

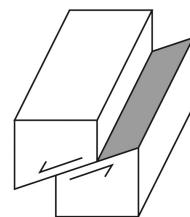
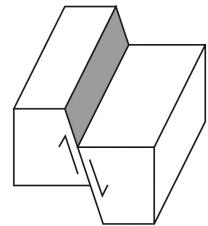
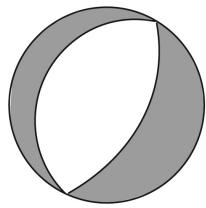
Strike Slip



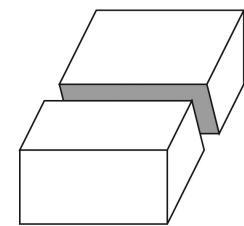
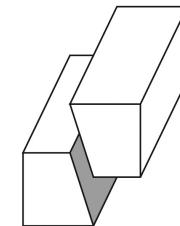
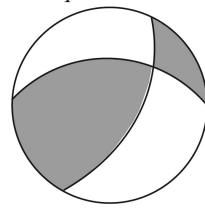
Reverse



Normal



Oblique



Focal mechanism estimation

