Class 23 Highlights   Nov 22
Peter Lindquist

Last Monday's class (Nov 22) focused on the concept of moments and applied the model of a bending beam to the Earth's lithosphere. Within a static bending beam, the sum of moments resulting from internal stresses and gravitational forces within the beam, and external forces on the beam will be zero. This allows us to derive a partial differential equation for how a beam may be deformed that depends on its flexural rigidity and the horizontal and vertical forces acting on the beam. This model can be applied to a sinusoidally warped elastic lithosphere to determine the response of the lithosphere to loading by things like ice sheets. Importantly, this model shows that small loads (short wavelength distortions) can be supported by the elastic lithosphere, but wider loads will cause sagging into the mantle. We finished by discussing the energy released by earthquakes and how we can quantify this using the estimated moment of an earthquake, which is simply the product of the elastic modulus of rock, the fault area, and the amount of slip.