**Background**
- Shatsky Rise, No.3 largest oceanic plateau
- ODP, IODP cored basaltic rocks
- Formed at ridge-ridge-ridge triple junction
- Two important questions:
  - Where do oceanic plateaus come from?
  - How do these volcanic mountains erupt?

**Morphology**
- Huge, dome-like edifice
- Gentle flank slopes, declining from summit
- Different from seamounts in the oceans

**Crustal Structure**
- Shallow flank slopes (<0.5°-1.5°) constructed by sub-parallel lava flows emanating from the volcano center and extending hundreds of km down to the surrounding seafloor
- Formation by extensive and far ranging lava flows emplaced at small slope angles
- Tamu Massif is an immense single, central volcano
- Moho is shallow (~7 km) beneath normal crust near the distal flanks of Tamu Massif and dips (~3°-5°) downward towards the center, reaching maximum thickness of ~30 km
- Seismic Moho (reflection and refraction) generally matches the Airy isostatic Model

**Numerical Modeling**
- The fast ridges are SW and SE branches (both 10 cm/yr) and the slow ridge is NE branch (3 cm/yr). *Note that the triple junction moved towards NE together with the formation of Shatsky Rise, and the NE branch has been subducted underneath Aleutian.
- For upwelling velocity structure, the slowest-spreading branch (the NE branch), model predicts a significantly stronger along-axis velocity increase toward the triple junction (Georgen and Lin, 2002).
- For thermal structure, the two fastest-spreading branches (SW and SE branched in this case) dominate the thermal structure of the region, and the temperature increases toward the triple junction (Georgen and Lin, 2002). *Note that the temperature increases sharply with depth, especially >20 km depth mostly >1000 °C. The visible temperature gradients only show up in a very thin layer (<20 km deep) relative to the 100 km thick model.

**What Next**
- Calculate the degree of melting in the mantle, and consider variable reference viscosity for the case of temperate- and pressure-dependent viscosity
- Add a hotspot to numerical model to simulate the plume-ridge interaction
- Given the total crustal volume from seismic and bathymetry studies, see how modeling can fit: solely by triple junction or mantle plume or their combination?