HOMEWORK 6
Oral presentations of flexure problems, December 1, 3

**Group A – Ice Shelf Flexure**
Discuss the tidal flexure model and derive equation 3 in the paper by Vaughn. [1995]. Generate the curve shown in Figure 5. Explain the overall findings of the paper.

**Group B – Seamount Flexure**
Discuss the seamount loading flexure model and derive equation 11 of Banks et al., [1977]. How would one calculate a model for a load of arbitrary shape? Use GMT or matlab to generate the flexure for a Gaussian-shaped seamount.

**Group C - Trench Flexure**
Discuss the trench flexure problem and derive the solution given in equation 2 of Caldwell et al., [1976]. Reproduce the graphs shown in Figure 3. Explain the overall findings of the paper.

**Group D - Fracture Zone Flexure**
Discuss the fracture zone flexure problem and derive the solution given in equation 11 of Sandwell and Schubert [1982]. Calculate the topography and stress across a single fracture zone with different flexural rigidities on either side (simple case, no time dependence, no lateral heat conduction). Explain the overall findings of the paper.

**Group E – Lake/Ocean Loading Flexure**
Discuss the lake loading flexure problem and its effect on the San Andreas Fault. Derive equations 2 and 3 in Luttrell et el. [2007]. Reproduce the thin-plate plots in Figure 4. Explain the overall findings of the paper. Another problem is to discuss the changes in earthquake patterns as sea level rose rapidly 7000 years ago [Luttrell and Sandwell, 2010].

**Group F - Flexure on Venus**
Discuss the Venus Flexure problem and why it is important. Derive equations 2 in Johnson and Sandwell [1994]. Derive equation 10 from equations 7 and 8. When might it be more appropriate to use a ring load rather than a bar load. Explain the overall findings of the paper in terms of the geothermal gradient on Venus.

**Group G - Outer Rise Yield Strength**
Discuss why it is important to consider the finite yield strength of the lithosphere when modeling flexure at subduction zones. Discuss equations (3) and (12) in McNutt and Menard [1982]. Discuss the difference between the elastic thickness and the mechanical thickness.

**Group H - Rift Flank Uplift**
Why do the flanks of rifts go up? Reproduce Figure 3 in Brown and Phillips [1999]. Discuss the equation (11) and Figure 5 in Wessel and Karner [1989].
**Group I – Sediment Covered Ridge**

Why is the gravity field over a sediment covered ridge mostly negative? Make a gravity anomaly profile over a Gaussian ridge with a height of 2 km, a Gaussian sigma $\sigma = 10$ km, and an elastic thickness of 5 km. Then bury the ridge with sediments of density of 2300 kg m$^{-3}$ and elastic thickness of 30 km. What is the resulting gravity field? How does this gravity field change with different values of starting and ending elastic thickness or flexural rigidity?