**Recent Volcanism, Mantle Plumes, and Volatiles on Venus**

**How wet is the interior of Venus?**
- Ar isotope data imply that Venus has lost only about 25% of its volatiles; Earth has lost ~50%.
- Volcanoes are the prime vehicle for volatiles escaping from the the interior.
- Increasing atmospheric SO$_2$ gas and possible regions of recent volcanism suggest that Venus’ volcanoes are still outgassing.

**Origin of recent volcanism and volatiles.**
- Recent volcanism identified by Venus Express is located at ‘hot spots’, areas like Hawaii where hot plumes rise from the core-mantle boundary.
- Convection models show that water in the mantle is likely needed to allow volcanism.
- Since Venus has an insulating lithosphere, the mantle will likely heat up. If volcanism is only occurring above mantle plumes, one interpretation is that past upper mantle melting dried that region (25% of the interior). Thus new water brought up in plumes from the lower mantle facilitates hot spot volcanism.

**How much hotspot volcanism is needed to produce the atmospheric water?** 10 plumes with a buoyancy flux of 500 kg/s erupting for 4 m.y. could outgass the required water, a plausible level of outgassing.

**Implications for Planetary Evolution.** This hypothesis could reconcile the lack of plate tectonics, which is thought be related to a dry lithosphere and upper mantle, with 75% of volatiles remaining in the interior.