Seminar 14 (to follow Lecture 14)

1) **"Tracers of the Slab" by Elliott, in Inside the Subduction Factory, Geophysical Monograph 138, Amer. Geophys. Union, pp. 23-45, 2005.**

2) **"Element transport from slab to volcanic front at the Marianna arc", by Elliott et al., JGR, 102, 14,991-15,109, 1997.**

Trace element abundances of arc lavas provide important constraints on the dehydration and melting processes that occur during subduction. For example, primitive mantle-normalized plots for incompatible elements in arc lavas have much more complexity than those for oceanic basalt, both MORB and OIB; e.g., compare Fig. 2a of Elliott (2005) with Figure 20 of Hofmann, "Sampling mantle heterogeneity through oceanic basalts: Isotopes and Trace Elements", chapter 3, vol. 2, Treatise of Geochemistry (as an aside this paper is also a good subject for a seminar discussion).

As discussed in these papers by Elliott, and many other papers on the geochemistry of arc lavas, the complexities in trace element abundances of arc lavas reflect two distinct compositions derived from the subducted slab; melt derived from the subducting slab (basalt and overlying sediment) and water-rich fluids derived by dehydration of altered oceanic lithosphere. The accessory mineral "rutile" plays an important role as a residual phase, thereby creating the Nb-Ta depletion anomalies that characterize arc lavas. Clearly papers on fluid-mineral partitioning and rutile-melt partitioning are highly relevant (see Section 2G and 3D of Appendix 1 of Lecture 7).

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