**PETROGRAPHY OF HAWAIIAN, ICELANDIC, AND COLUMBIA RIVER VOLCANICS**

**Objective:** The volcanics of Hawaii, Iceland, and the North Shore all share a common origin. The formed as a result of the interaction of a mantle plume with the overlying crust. Low degrees of partial melting near the outside of the mantle plume result in alkaline basalt (basanite), whereas high degrees of partial melting result in tholeiitic basalts (Fig. 1). Fractional crystallization of these basaltic compositions leads to silica- and alkali-enriched compositions extending out to rhyolite, trachyte, and phonolite. Examples of both tholeiitic and alkali lavas can be observed in the Hawaiian volcanic suite, whereas tholeiitic lavas dominate the Icelandic and Columbia River volcanic suites. We will spend this lab familiarizing ourselves with these different types of lava flows associated with oceanic intraplate volcanism.

**Procedure:** Select 7 thin sections and hand samples from the three sample suites. Be sure to include a sample of an alkali basalt (or nephelinite), a felsite (rhyolite or dacite), a hawaiite, and an andesite in your selection. Make sure you have at least one thin section/hand sample from each suite. Complete a petrographic description form for each sample.

![Figure 1](image-url). Differentiation trends for an ocean island tholeiitic series (Iceland), a silica undersaturated ocean island alkaline series (Tristan da Cunha) and a slightly oversaturated OIA series (Ascension Island). Dashed red line marks the boundary between the subalkaline (tholeiite) field and the alkaline field. Winter (2001) Figure 14-2. After Wilson (1989) Igneous Petrogenesis. Kluwer.