"Analysis of the Windy-Craggy Suite"

The major oxide analysis of the Windy-Craggy suite of (dominantly) volcanic rocks, were plotted on a ternary AFM diagram (after Irvine and Barager, 1971) to determine if tholeiitic or not (FIGURE 1). Typically the analysis plotted within the magnesium-rich tholeiitic field, with only one spurious result well within the calc-alkaline field. Note however, that due to the analysis being reported in total Fe % (as versus FeO plus Fe_2O_3) the corrective procedures as applied by Irvine and Barager with respect to excess Fe_2O_3, could not be applied. Generally this procedure would result in a slight shift of the points towards the calc-alkaline field, probably however, not enough to make any appreciable difference in this case.

In the absence of trace-element analysis (particularly Zr, Y, Rb, Sr, Nb), it was decided to subject the available analysis to two further discriminatory plots on the basis of their minor oxide components.

Initially, a simple TiO_2-K_2O-P_2O_5 ternary plot (after Pearce et al., 1975) was used, having been found useful to determine between basaltic rock suites of oceanic and non-oceanic affinity. Even after applying the corrective procedures as outlined by Pearce et al., the resultant ternary plot produced a diffuse point spread, with the field boundary roughly bisecting the grouping (FIGURE 2). Pearce et al. stated that metamorphism and alteration could produce a downward shift in the point grouping, that being the case the rock suite could have originally been well within the oceanic field prior to any metamorphism and/or alteration taking place. This could best be determined on field and petrologic evidence, unfortunately absent in this case.

On the assumption that the Windy-Craggy volcanics are indeed oceanic tholeiitic basalts (as versus continental), a further discriminatory ternary

plot was performed (FIGURE 3). This involved the end members MnO (x10) - TiO_2 - P_2O_5 (x10) as suggested by Muller (1983), and is designed to discriminate between mid-ocean ridge, island-arc tholeiite, island-arc calc-alkaline, ocean-island tholeiite, and ocean-island alkalic basaltic rocks. Again however, the point spread was diffuse, and overlapped portions of four of the five fields. This result could be due to the statistically low number of analysis plotted, or could in fact be because of the continental affinity of the Windy-Craggy basalts, as suggested of similar results by Muller (1983). This result of course contradicts that determined in Figure 2 (after Pearce et al., 1975), and probably more than anything, says something about the reliability of using minor-major element ternary diagrams as a sole criteria in determining petrotectonic environments.