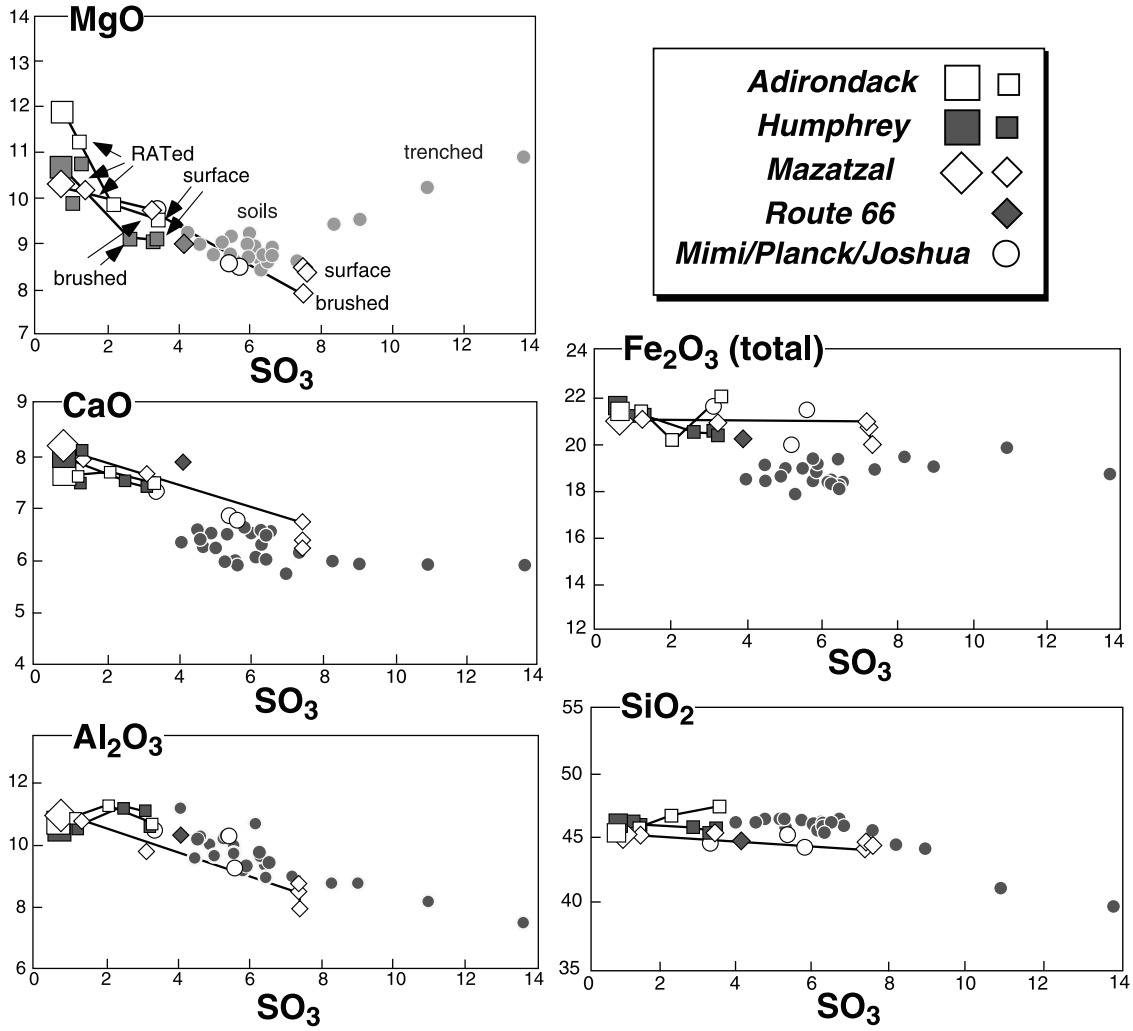

Figure 8. APXS analyses of rocks and soils [*Gellert et al.*, 2006], oxides plotted versus SO_3. Clean rock compositions (large symbols) are derived by extrapolating from brushed compositions through RATed compositions to 0.3 wt% sulfur (0.75 wt% SO_3). Route 66 (RATed composition) is distinguished from Mimi, Planck, and Joshua (unbrushed compositions).

ing addition of $MgSO_4$) seen in subsurface soils exposed in trenches [*Haskin et al.*, 2005].

[25] The larger symbols in Figure 8 represent end-member rock compositions determined by extrapolation from the brushed through the RATed values to 0.75 weight% SO_3, equivalent to 0.83 weight% FeS. Visual inspection showed that grinding commonly did not remove all vestiges of the rinds, so this extrapolation corrects for any remaining rind in RAT holes. The extrapolated rock compositions are given in Table 1. Rock compositions based on the new calibration are only slightly different from those reported by *McSween et al.* [2004]; MgO and Na_2O are lower and Al_2O_3 is higher. These rock compositions plot on the boundary separating the basalt and picrobasalt fields in the alkalis-silica diagram used to classify volcanic rocks (Figure 9), hence our use of the term "picritic basalt" to describe these rocks.

4.5. Summary of Constraints on Rock Mineralogy

[26] Calculated CIPW norms for the new end-member rock compositions are given in Table 1. These calculations assume Fe^{2+}/Fe(total) ratios for RATed rocks as determined by Mössbauer measurements [*Morris et al.*, 2004], as described above. The normative mineral proportions for the three basalts are illustrated in Figure 10.

[27] These data compare favorably with the mineral assemblage identified by Mössbauer spectroscopy, but the inferred relative proportions of minerals differ. Proportions of iron-bearing minerals (relative peak areas% [*Morris et al.*, 2004], assumed to be volume%, and renormalized for non-iron-bearing minerals (plagioclase, apatite) in calculated norms) for Adirondack/Humphrey/Mazatzal, respectively, are olivine 35/35/40, pyroxenes 22/22/22, and oxides 15/14/9. However, it is not possible to compare directly the normative mineral abundances (weight%,) with Mössbauer abundances (volume%).

[28] As noted earlier, MiniTES spectra for rocks cannot be deconvolved because of down-welling radiance effects, but olivine is confirmed. Pancam spectra are consistent with the presence of olivine and/or pyroxenes. Quantitative MI image analysis of dark crystals inferred to be olivine in Humphrey is similar to the normative olivine content, but olivine point counts in the other rocks are considerably lower.