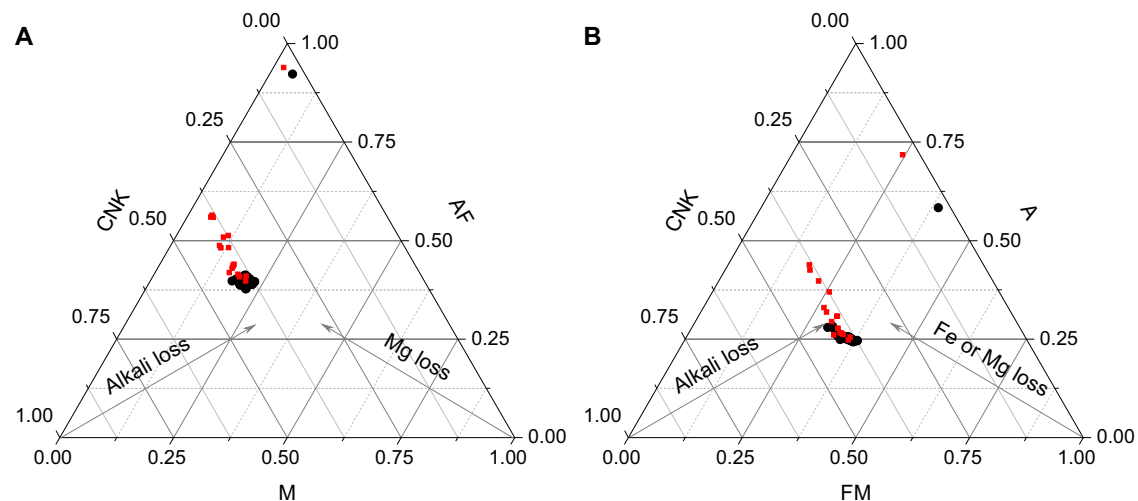Figure 2. Ternary plots showing samples from Sawlan (2018) (black circles) and altered Columbia River Basalt Group (CRBG) samples (small red squares; Thomson et al., 2014; Baker and Neill, 2017; Tolan et al., 2009b). Arrows indicate the direction of trends that would be produced by leaching. A: AF-CNK-M plot ($Al_2O_3 + Fe_2O_3$, $CaO + Na_2O + K_2O$, MgO). B: A-CNK-FM plot (Al_2O_3, $CaO + Na_2O + K_2O$, $Fe_2O_3 + MgO$).

Approximately 18 of the 112 samples from Sawlan (2018) that are shown in Figure 3 plot off the Fe-Ti trend defined by most of the samples. These samples have Ti contents that fall within the range defined by other samples, but their Fe contents are low. These samples have been marked in Table 1 with an asterisk. Almost all of these samples have negative mobility ratio values for Fe, and this group of samples represents almost all of the samples in the database of Sawlan (2018) with negative Fe mobility ratios. Therefore, it appears possible that this subset of samples has undergone some alteration.

Most of these samples also have anomalously low Mg contents (Sawlan, 2018, his table 1), suggesting possible minor dissolution of ferromagnesian minerals under reducing conditions that facilitated Fe loss. The MIA-R values (Table 1) are slightly elevated for approximately half of these samples, indicating the relative sensitivity of this index to leaching of Fe and Mg. These points are clearly identifiable on the A-CNK-FM graph, as shown in Figure 4, which shows only the portion of the ternary plot surrounding the cluster of data points in Figure 2B. In Figure 4, the circled data points from Sawlan (2018) are those that do not
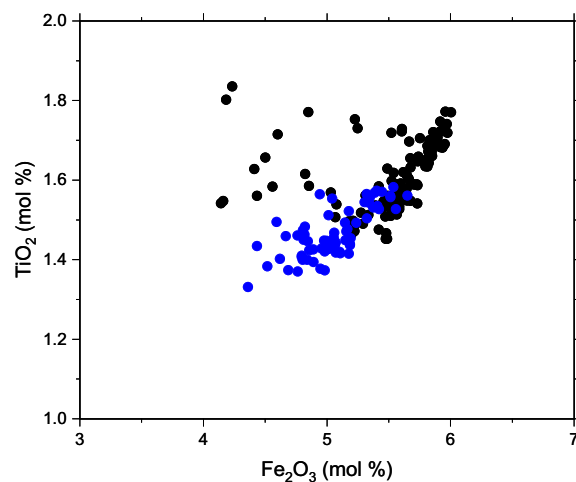
Figure 3. Graph of molar TiO_2 versus Fe_2O_3 contents in samples from Sawlan (2018) (black circles) and from Reidel (2005) (blue circles). To view the two layers of Figure 3 in the PDF version of this paper, open the PDF in Adobe Acrobat or Adobe Reader.