

The Plumbago North pegmatite is a lithium-rich pegmatite body recently discovered on the north slope of Plumbago Mountain in Newry, Maine that is known for its massive spodumene crystals. Due to its potential as an economic lithium resource, a study was conducted to determine the degree of chemical fractionation achieved by the pegmatite during its emplacement. K/Rb and Mn/Fe ratios in heavy minerals from 26 sample sites across the exposed pegmatite body indicate that the pegmatite underwent extensive chemical fractionation with respect to measured K/Rb ratios, however Fe/Mn and Nb/Ta ratios from the same samples show a lesser degree of fractionation. Samples taken along the hanging wall contact on the west end of the quarry shows a steady decrease in K/Rb ratios from 36.684 at the country rock contact to 2.870 towards the south, indicating high fractionation and the presence of rare mineral species. 100 apatite grains from 19 of the 26 locations were also analyzed for their Mn, Fe, and Sr contents. Results show that a majority of the apatite grains analyzed were Mn dominant, especially those near the hanging wall contact on the west end of the exposed pegmatite.

Another notable result of the study is the relative paucity of mineral species seen at the Plumbago North pegmatite despite its advanced fractionation. For instance when compared to the Emmons pegmatite, another pegmatite located 25 km south in Greenwood, pollucite is seen as large masses >1 meter in the core-margin zone of the pegmatite, however at Plumbago North very little pollucite is seen anywhere in the exposed section of the pegmatite.

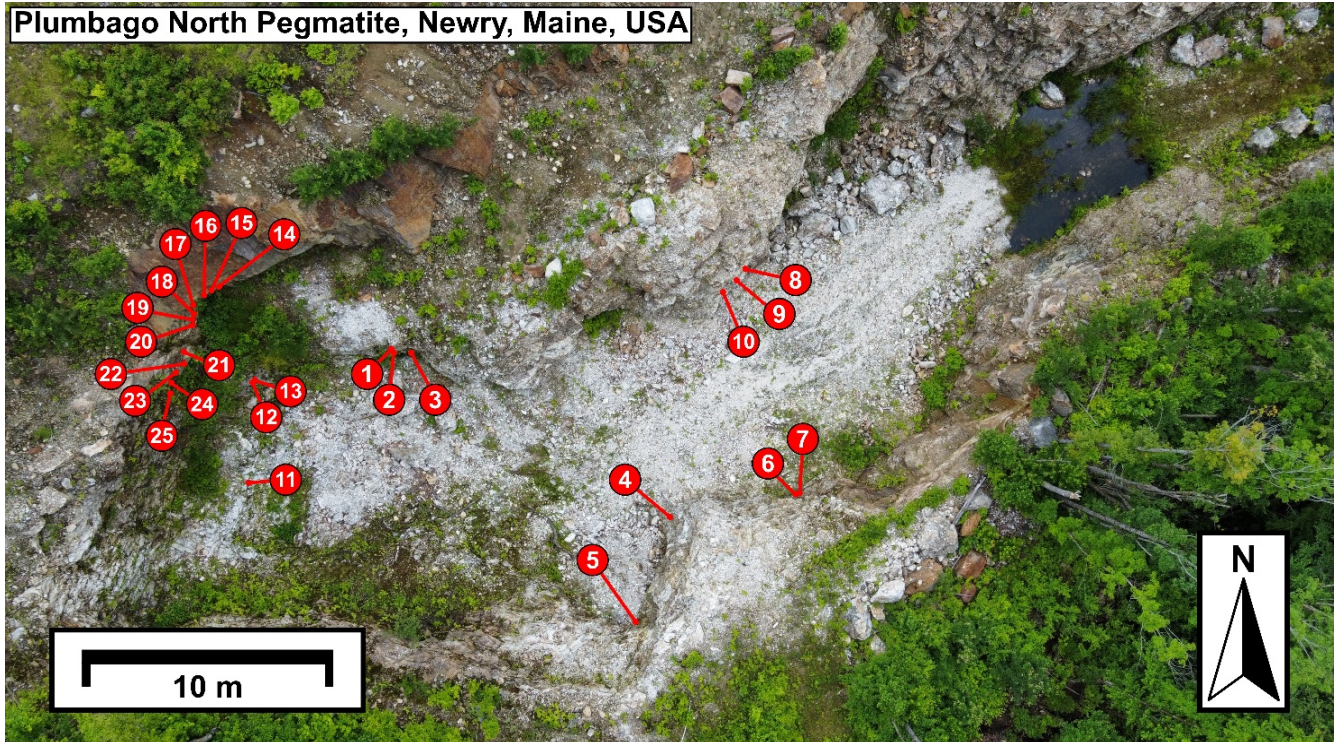


Figure 1: Overhead view of the exposed section of the Plumbago North pegmatite. Sample points are highlighted in red.

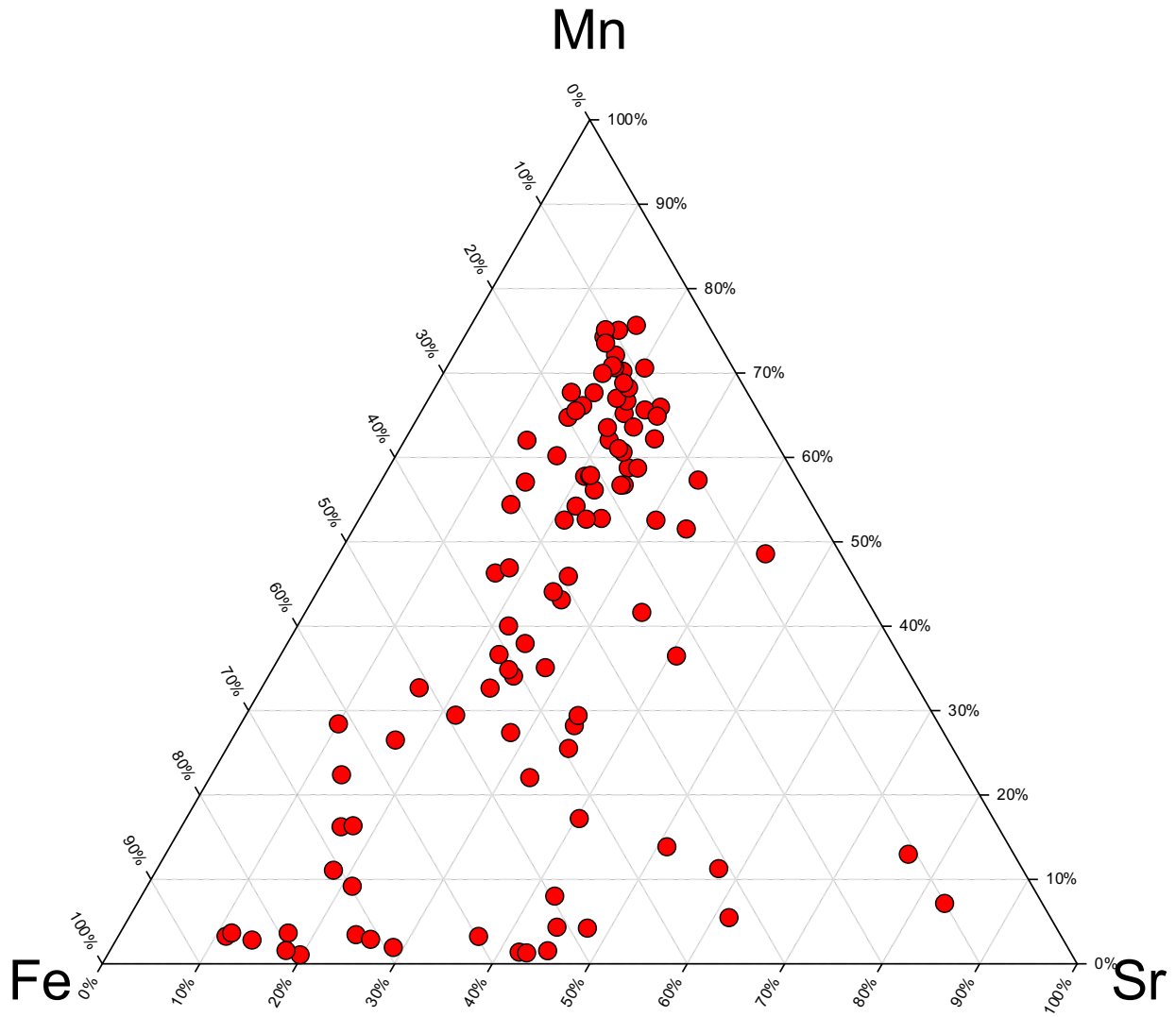


Figure 2: Ternary plot showing Fe/Mn/Sr concentrations for apatite crystals at Plumbago North

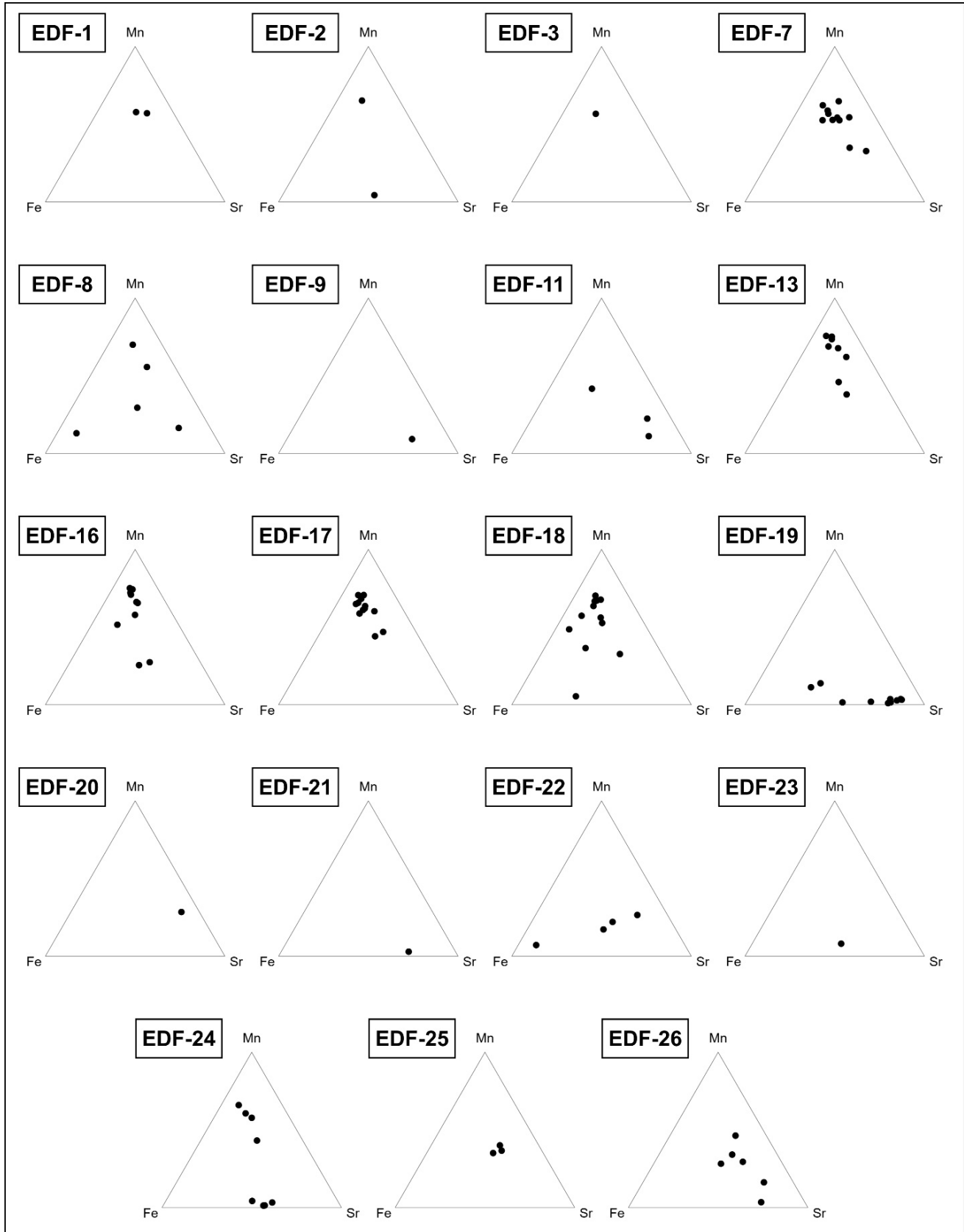


Figure 3: Fe-Mn-Sr ratios for apatite grains from 19 sample locations at Plumbago North.

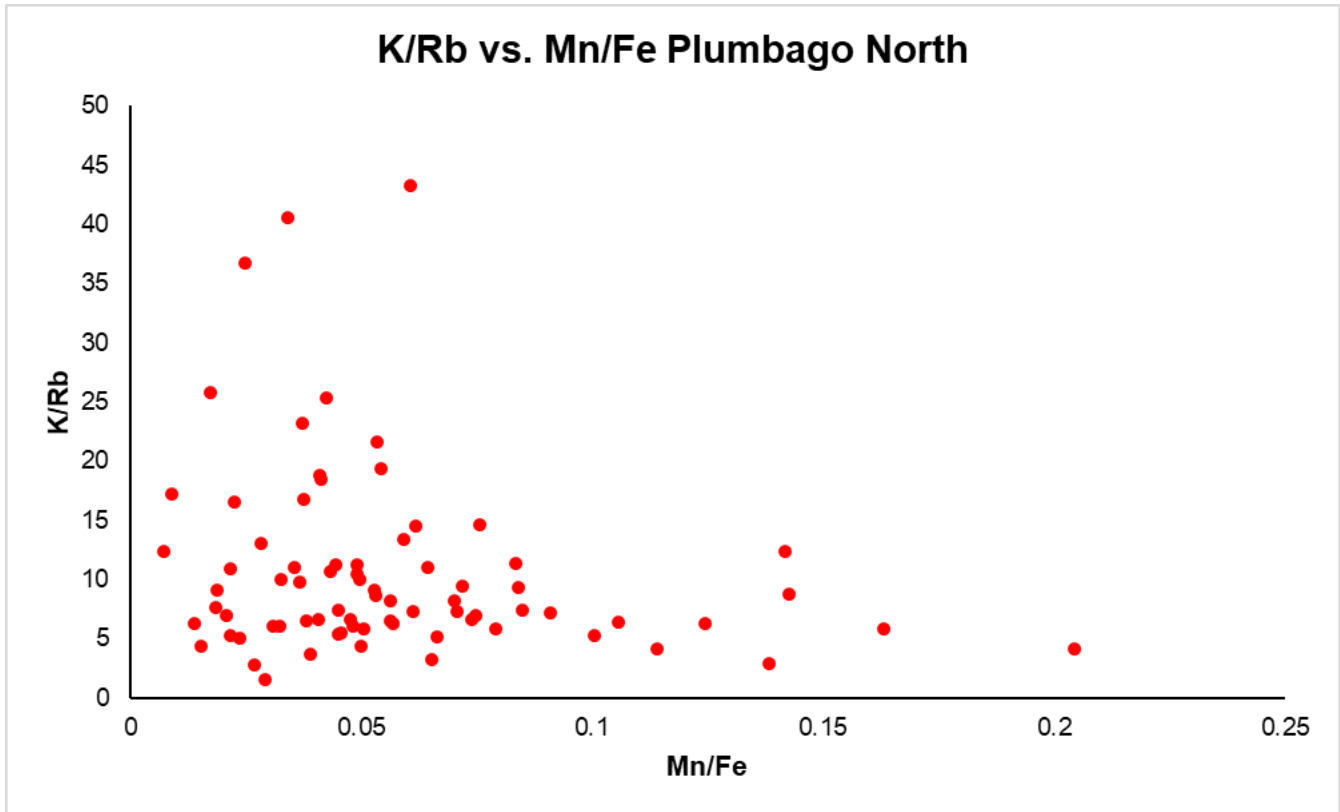


Figure 4: K/Rb vs. Mn/Fe ratios of the Plumbago North pegmatite.