The Raton-Clayton Volcanic Field (RCVF) is located along the western edge of the Great Plains province in northeastern New Mexico at the eastern tip of the Jemez Lineament. The Jemez Lineament is a zone of structural weakness formed by accretion of Precambrian Yavapaii and Mazatzal island arc terrains. Raton-Clayton volcanism is the eastern-most extent of Cenozoic volcanism until the Mid-Atlantic Ridge. The RCVF offers an opportunity to understand how open-system processes have affected basalts that ascended through the crust of the Great Plains and to evaluate un-modified melts that are generated from mantle underlying this region of the western United States. The youngest phase of volcanism in the RCVF is the Capulin-phase which ranges from ~1.5 Ma to 0.03 Ma. The youngest (~50 ka - ~30 ka) Capulin-phase basalts were analyzed for this study. Whole-rock and olivine-hosted melt inclusion major element, trace element, and isotope data are used to evaluate the effects of open-system processes in Capulin-phase basalts. Variations in $^{87}\text{Sr}/^{86}\text{Sr}$, $^{143}\text{Nd}/^{144}\text{Nd}$, $^{208}\text{Pb}/^{204}\text{Pb}$, $^{207}\text{Pb}/^{204}\text{Pb}$, and $^{206}\text{Pb}/^{204}\text{Pb}$ indicate that fractionation alone cannot explain the evolution of Capulin-phase basalts. Trace element, $^{87}\text{Sr}/^{86}\text{Sr}$, $^{208}\text{Pb}/^{204}\text{Pb}$, $^{207}\text{Pb}/^{204}\text{Pb}$, and $^{206}\text{Pb}/^{204}\text{Pb}$ trends are consistent with open-system processes having contributed to the petrogenesis of Capulin-phase basalts.