The Pleiades volcanic complex in the W Antarctic rift: basaltic magmas differentiation affected by ice cover during the last glacial maximum

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The Pleiades volcanic complex, northern Victoria Land, Antarctica, is made up of ~20 small cones erupting hawaiite to trachyte products, defining a complete Na-alkaline differentiation trend, without any Daly Gap. Mafic samples are characterized by Ta-Nb enrichments, low $^{87}Sr/^{86}Sr$ (~0.7037) and high $^{143}Nd/^{144}Nd$ (~0.51284) ratios, suggesting a within-plate affinity and derivation from a sub-lithospheric mantle source. $^{87}Sr/^{86}Sr$ increasing and $^{143}Nd/^{144}Nd$ decreasing with respect to SiO_2 indicate a significant amount of crustal assimilation along with fractional crystallization.

Erupted products are ~70 km^3 in volume. However, fractionation models point out that the volume of primitive magma may be some 40 times larger, suggesting an unusually large magma plumbing system. The ^{40}Ar-^{39}Ar ages (30.3±4.5 and 24.7±1.8 ka), show that Pleiades were active during the last glacial maximum, when the ice sheet may have been much thicker. A thick mantling ice cover would be capable of suppressing eruptions and lead to a high magma residence time in depth, favoring extensive fractionation and high rates of crustal assimilation.