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LETTER

Toward a thermal model for the Skaergaard liquidus

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ABSTRACT

After a review of history, it is shown that in a comprehensive 1-atm study by McBirney and Naslund (1990), the Skaergaard liquidus temperature is linear from LZa to UZa on stratigraphic height when corrected to pressure. The augite saturation point at LZa/b has the same liquid composition in terms of plagioclase An content as the corresponding point in the Kiglapait intrusion, studied at 5 kbar by Morse et al. (2004). This temperature, 1203 °C at 5 kbar, is transformed to the Skaergaard pressure at LZa/b to a value of 1173 °C. From this fixed point, all other liquidus temperatures at Skaergaard are scaled to mean plagioclase core compositions from a detailed study by Toplis et al. (2007). All such points from LZb to UZa lie, within experimental error, on the regression from McBirney and Naslund, and the further points in UZb and UZc also agree. Plagioclase-based temperatures at the base of LZa exceed the earlier estimates by ~24 °C and imply a possible temperature of 1210 °C in the Hidden Zone. These results provide a good interim model for the Skaergaard liquidus pending further experimental study at the liquidus.

Keywords: Skaergaard intrusion, cumulate liquidus, experimental temperature, plagioclase cores, augite saturation, pressure correction