specific features separating them from known kimberlites. Features common to the Nakyn and SUKL kimberlites include: 1) their related to wide variations of contained carbonate minerals (dolomite and calcite); 3) absence of magnesian ilmenite; 4) low total content of indicator minerals (Cr-pyropes and chromites) < 0.5 kg/t; 5) a very wide range of

Kimberlites of the recently discovered Nakyn field (NF), Siberia, and those of the Snap Lake/King Lake (SUKL) kimberlite dyke system, micaceous character and relatively low K2O/TiO2 ratios; 2) a wide range of CaO contents (e.g.: 0.6-26.5 wt.% for SUKL kimberlites)

Mapping of the tunnels suggested that the complex is dominated by one main sheet, with an average thickness of 2-3m. Petrographic plan view area of 2x3km. The diamondiferous Snap Lake kimberlite is a rare example of a potentially economic, near horizontal sheet-like deposit. The kimberlite has been exposed in two underground tunnels at 124m (upper) and 164m (lower) from the present surface. The Snap Lake kimberlite is located 220km northeast of Yellowknife in the Northwest Territories. The kimberlite occurs in the southeastern part of the Slave Craton, intruding Archaean granitoids and metavolcanics. The age of the kimberlite is ~523±6.9 Ma. Core drilling shows that the Snap Lake kimberlite consists of a single dominant kimberlite unit that locally splits into several kimberlite units, or 'strings', that may connect down dip or laterally along strike. The kimberlite sheet dips to the northeast at ~15° with a minimum plan view area of 2x3km. The diamondiferous Snap Lake kimberlite is a rare example of a potentially economic, near horizontal sheet-like deposit. The kimberlite has been exposed in two underground tunnels at 124m (upper) and 164m (lower) from the present surface. Mapping of the tunnels suggested that the complex is dominated by one main sheet, with an average thickness of 2-3m. Petrographic features, supported by matrix mineral and whole rock compositions, show that these rocks can be classified as Group 1, phlogopite monticellite kimberlite. Within the main sheet there are also two volumetrically minor, but distinctly different phases: firstly an altered hypabyssal kimberlite breccia which contains both metavolcanic and granitoid xenoliths and secondly, a hypabyssal granitoid-rich breccia lacking metavolcanic xenoliths.

The kimberlite in the main sheet is composed of xenolith-poor, coarse to very coarse grained olivine macrocrysts (~5-30 modal %), rare mantle-derived xenocrysts of garnet, olivine phenocrysts (~5 modal %) and less common phlogopite microphenocrysts set in a groundmass of monticellite, phlogopite, spinel,apatite, perovskite, serpentine and carbonate. The olivine and monticellite have been completely pseudomorphed by serpentine. Four types of phlogopite have been recognised petrographically. Type I and II are macrocryst and phlogopite monticellite, respectively. Type III groundmass phlogopite occurs as small, colourless, late-stage laths with straight and/or irregular step-like boundaries. Type IV groundmass phlogopite occurs as larger, colourless, elongate subhedral laths having a deccussate texture, and they poikilitically enclose monticellite, spinel and olivine microphenocrysts. Type IV phlogopites occur mainly in the upper sampling tunnel while the Type III phlogopites occur mainly in the lower sampling tunnel.

The petrographically distinct Type III and IV phlogopites also have contrasting compositions and zoning patterns. Type III and IV can be subdivided into two distinct groups based on their TiO2 content, with Type III having 0.8-2.5 wt.% versus 0.3-0.8 wt.% in Type IV. Type III phlogopite grains show enrichment in BaO content from the cores (<1.0 wt.%) to the rims (1.5-5.0 wt.%). In contrast, BaO content of Type IV phlogopite grains have BaO-enriched cores (6.5-11.0 wt.%) with lower BaO rims (<4.2 wt.%). The Type III phlogopite grains often have high Cr2O3 cores (<1.7 wt.%), which do not occur in the Type IV phlogopite grains. The difference in the occurrence and composition of the late stage phlogopite suggests that the sheets encountered in the upper and lower sampling tunnels could be separate phases of kimberlite. Further comparative studies of bulk and mineral compositions of the kimberlites are needed to confirm, or reject, this hypothesis and consider alternative explanations.

**SESSION 7: KIMBERLITE PETROGENESIS**

**7.P1 PETROLOGY OF THE SNAP LAKE KIMBERLITE, NWT, CANADA**

Mogg TS*, Kopylova MG, Scott Smith BH and Kirkley MB

The Snap Lake kimberlite is located 220km northeast of Yellowknife in the Northwest Territories. The kimberlite occurs in the southeastern part of the Slave Craton, intruding Archaean granitoids and metavolcanics. The age of the kimberlite is ~523±6.9 Ma. Core drilling shows that the Snap Lake kimberlite consists of a single dominant kimberlite unit that locally splits into several kimberlite units, or 'strings', that may connect down dip or laterally along strike. The kimberlite sheet dips to the northeast at ~15° with a minimum plan view area of 2x3km. The diamondiferous Snap Lake kimberlite is a rare example of a potentially economic, near horizontal sheet-like deposit. The kimberlite has been exposed in two underground tunnels at 124m (upper) and 164m (lower) from the present surface. Mapping of the tunnels suggested that the complex is dominated by one main sheet, with an average thickness of 2-3m. Petrographic features, supported by matrix mineral and whole rock compositions, show that these rocks can be classified as Group 1, phlogopite monticellite kimberlite. Within the main sheet there are also two volumetrically minor, but distinctly different phases: firstly an altered hypabyssal kimberlite breccia which contains both metavolcanic and granitoid xenoliths and secondly, a hypabyssal granitoid-rich breccia lacking metavolcanic xenoliths.

The kimberlite in the main sheet is composed of xenolith-poor, coarse to very coarse grained olivine macrocrysts (~5-30 modal %), rare mantle-derived xenocrysts of garnet, olivine phenocrysts (~5 modal %) and less common phlogopite microphenocrysts set in a groundmass of monticellite, phlogopite, spinel, apatite, perovskite, serpentine and carbonate. The olivine and monticellite have been completely pseudomorphed by serpentine. Four types of phlogopite have been recognised petrographically. Type I and II are macrocryst and phlogopite monticellite, respectively. Type III groundmass phlogopite occurs as small, colourless, late-stage laths with straight and/or irregular step-like boundaries. Type IV groundmass phlogopite occurs as larger, colourless, elongate subhedral laths having a deccussate texture, and they poikilitically enclose monticellite, spinel and olivine microphenocrysts. Type IV phlogopites occur mainly in the upper sampling tunnel while the Type III phlogopites occur mainly in the lower sampling tunnel.

The petrographically distinct Type III and IV phlogopites also have contrasting compositions and zoning patterns. Type III and IV can be subdivided into two distinct groups based on their TiO2 content, with Type III having 0.8-2.5 wt.% versus 0.3-0.8 wt.% in Type IV. Type III phlogopite grains show enrichment in BaO content from the cores (<1.0 wt.%) to the rims (1.5-5.0 wt.%). In contrast, BaO content of Type IV phlogopite grains have BaO-enriched cores (6.5-11.0 wt.%) with lower BaO rims (<4.2 wt.%). The Type III phlogopite grains often have high Cr2O3 cores (<1.7 wt.%), which do not occur in the Type IV phlogopite grains. The difference in the occurrence and composition of the late stage phlogopite suggests that the sheets encountered in the upper and lower sampling tunnels could be separate phases of kimberlite. Further comparative studies of bulk and mineral compositions of the kimberlites are needed to confirm, or reject, this hypothesis and consider alternative explanations.

**7.P2 KIMBERLITES OF THE NAKYN FIELD, SIBERIA, AND THE SNAP LAKE/KING LAKE DYKE SYSTEM, SLAVE CRATON, CANADA: A NEW VARIETY OF KIMBERLITE WITH PROPOSED ULTRADEEP ORIGIN**

Pokhilenko NP*, Agashev AM, McDonald JA, Sobolev NV, Mityukhin SI, Vavilov MA and Yanygin YT

Kimberlites of the recently discovered Nakyn field (NF), Siberia, and those of the Snap Lake/King Lake (SL/KL) kimberlite dyke system, Slave Craton, Canada, have definite geochemical and petrological features linking them to those of Groups 1 & 2 kimberlites as well as specific features separating them from known kimberlites. Features common to the Nakyn and SL/KL kimberlites include: 1) their micaceous character and relatively low K2O/TiO2 ratios; 2) a wide range of CaO contents (e.g.: 0.6-26.5 wt.% for SL/KL kimberlites) related to wide variations of contained carbonate minerals (dolomite and calcite); 3) absence of magnesian ilmenite; 4) low total content of indicator minerals (Cr-pyropes and chromites) < 0.5 kg/t; 5) a very wide range of Cr2O3 content in pyropes (up to 17 wt.% for SL/KL
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