Kimberlites in northern Labrador and Nunavut: do they have exotic relatives in Québec?

Derek H.C. Wilton
Department of Earth Sciences, Memorial University of Newfoundland, St. John's, NF A1B 3X5
<dwilton@sparky2.esd.mun.ca>

A NATMAP project in 1995 located at least eight so-called ultramafic lamprophyre dykes in the Cape Chidley area of northernmost Labrador and Nunavut. They were described as dark-grey to black, recessively weathering dykes with local olivine nodules. Thin-section studies revealed them be alkalic, olivine-phlogopite-carbonate-perovskite rocks. The dykes were post-tectonic and grouped with Phanerozoic dykes.

Copper Hill Resources Ltd. (CUHL) of St. John's, NF, staked the area and sampled six of the dykes. The whole rock samples, weighing up to 18.5 kg, were crushed and separated into heavy mineral concentrates (HMC) from which garnet, clinopyroxene, orthopyroxene, olivine, ilmenite and chromite indicator minerals were picked and analysed by electron microprobe at a commercial laboratory.

Based on the mineralogy of the samples collected, two of the dykes are classified as kimberlite and the remainder as lamprophyres, though they have some mineralogical features in common with the kimberlites. Sample size was very small for definitive determinations; for instance, one kimberlite had a strike extension, which was classified as lamprophyre. Within the kimberlites, the following mineral phases were identified: (1) lherzolitic, eclogitic and megacrystal garnet (megacrystal garnet was also found in some of the lamprophyres), (2) clinopyroxene which plots in Fipke's diamondiferous CPX domain (as does one lamprophyre), (3) orthopyroxene with < 1% to 1.5% Al_2O_3, and (4) olivine with Fo contents of ~ 88-92 (some of the lamprophyres have two populations of olivine with clusters of similar high Fo values). Orthopyroxene and clinopyroxene geothermobarometers indicate a harzburgite chemistry for some mineral separates and also that the postulated geotherm for the intrusive history of the dykes is permissive of diamond stability.

A soil geochemical sample collected over one dyke yielded significant pyrope, chrome diopside and olivine and minor amounts of indicator minerals were recovered from small stream sediment samples.

Seventy-five km southwest of these dykes, in the Abloviak Shear zone, Ungava Bay, Québec, Twin Gold Ltd. has been conducting an active exploration program in possibly similar kimberlite dykes from which they report significant concentrations of diamonds.