

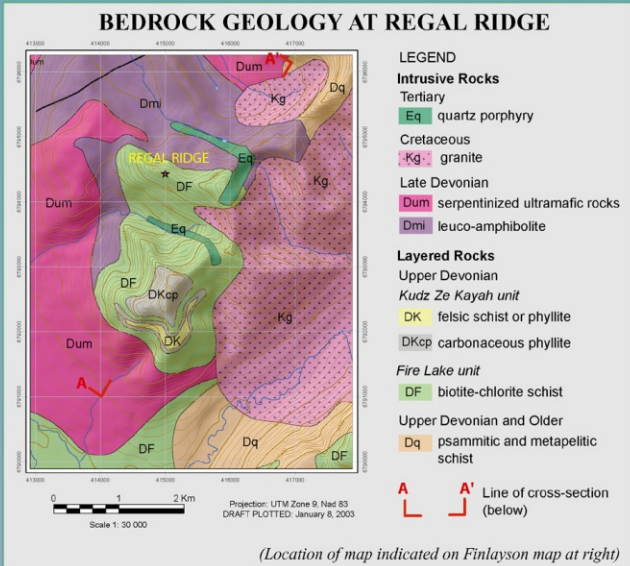


'WHAT ABOUT THOSE EMERALDS, EH?'

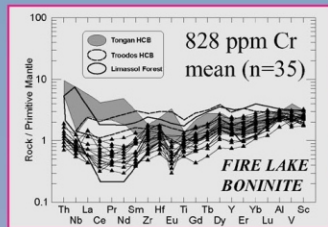
Geological Setting of Emeralds At Regal Ridge (SE Yukon) Provides Clues to Their Origin - And To Other Places To Explore

Donald C. Murphy Anna Fonseca
Panya S. Lipovsky and Amy Stuart Akhbar Geological Consulting
Yukon Geology Program Whitehorse, Yukon
Lee Groat Stephen J. Piercey
University of British Columbia Laurentian University

In 1998, a new occurrence of emeralds was discovered in Finlayson Lake area, southeastern Yukon. Emeralds occur in the alteration selvages of quartz-tourmaline (-scheelite-muscovite-beryl) veins cutting biotite-chlorite metavolcanic schist in the metamorphic aureole around one of the area's largest bodies of mid-Cretaceous granite. In the area of the showing, the mafic schist, part of the widespread Upper Devonian Fire Lake unit, is meta-basalt of boninitic composition (see spidergram below) which overlies a thick, laterally tapering slab of variably serpentinized mafic and ultramafic meta-plutonic rocks. Using various geometric and geological criteria, this slab is inferred to be a sill, comagmatic with the Fire Lake unit, which intruded laterally from feeder dykes localized along a nearby syn-volcanic fault.



Upper Devonian Fire Lake unit, is meta-basalt of boninitic composition (see spidergram below) which overlies a thick, laterally tapering slab of variably serpentinized mafic and ultramafic meta-plutonic rocks. Using various geometric and geological criteria, this slab is inferred to be a sill, comagmatic with the Fire Lake unit, which intruded laterally from feeder dykes localized along a nearby syn-volcanic fault.



The map trace of the western contact of the granite lies about 2 km east of the Crown showing. The granite is biotite-muscovite-bearing, discordant with respect to planar fabrics of the host metamorphic rocks, yet locally weakly foliated, indicating late- to post-kinematic emplacement. As with most Cretaceous granites in the area, tourmaline is a common accessory phase, occurring disseminated throughout the body or in quartz vein arrays both in and around the granite. The western contact of the granite is observed to be gently west-dipping, underlying the Crown showing at a relatively shallow depth.



The orientations of the western granite contact and the contact between the Fire Lake unit and the co-magmatic mafic and ultramafic sill are such that the granite likely intrudes through the ultramafic sill at depth. Furthermore, the gentle orientation and local map trace of the granite contact suggests that the exposed granite is near its roof, ideal for the concentration of volatile-rich fluids.

EMPIRICAL MODEL FOR THE FORMATION OF EMERALDS AT REGAL RIDGE

The intrusion of relatively evolved granite into rocks of Cr-rich rocks (mafic and ultramafic composition) seems an ideal setting for the formation of emeralds. The alteration of host mafic and ultramafic rocks by hot, volatile-rich fluids emanating via vein arrays off the roof of the granite would put Be in the same place as Cr, an obvious, but geologically difficult to attain, precondition for emerald formation.

