Module B. Colour from the Cosmos

Lesson 15: Beryl Geology and Geography

Where is it Found Locally?

*Emerald*

Although not a commercial producer, Canada is host to a number of emerald occurrences, most of which occur in the Northern Cordilleran mountains of BC, Yukon, and NWT. A single occurrence is also present in Ontario.

The Ghost Lake emerald occurrence near Dryden in northwestern Ontario is associated with pegmatite (Be source) which has intruded schist (Cr source). Most of the emerald occurs at the contact between the southern and central limbs of the pegmatite and is associated with the minerals K-feldspar, plagioclase, quartz, phlogopite, and tourmaline.

At the Lened emerald occurrence in the Northwest Territories, limestone has been thrust over vanadium-bearing black shales. Emerald occurs in quartz veins with calcite which extend from the thrust fault and pinch out in the overlying limestone. It has been assumed that a nearby granite body is associated with the emeralds, but it has not been undoubtedly proven yet.

Emerald was discovered at Tsa da Glisza (formerly Regal Ridge) in the Yukon Territory in 1998. The emerald mineralization is associated with magmatic quartz veins with tourmaline and small pegmatites that intrude a Cr-bearing schist. Emerald occurs most commonly along the margins of quartz veins, but is also found within the quartz veins themselves, and in alteration zones that surround the veins. The emerald occurrence is underlain by a granite pluton, which is the source of Be-bearing fluids and the heat that drove the geochemical reactions.

Crystals of V-dominant emerald were discovered in 1989 at Red Mountain, near Stewart on the central coast of British Columbia. The emerald occurs as small opaque crystals with numerous fractures in narrow quartz veins with pyrite and calcite that cut volcanic rocks adjacent to a quartz-monzonite intrusion.

A new occurrence with no magmatic association was discovered in the Mackenzie Mountains of the Northwest Territories in the summer of 2007 and is the subject of current research at Laurentian University. These green beryl crystals are colored primarily by vanadium and share genetic similarities to the emeralds found in Colombia! The full significance of this occurrence is still unfolding.

In the United States, emerald is found in a few locations including Hiddenite, North Carolina, and the Unita Mountains of Utah. At Hiddenite, the emeralds are associated with pegmatites and in the Unita Mountains, the emeralds seem to share a similar genetic story to those of Colombia, although these occurrences have not been studied in detail.

*Other Gem Beryl*

Aquamarine and other varieties of gem beryl are also common in Canada, but again, are not produced commercially here. The Rocky Mountains of BC and up into Yukon are so jam packed with beryl occurrences that the list would be overwhelming! Furthermore, non-emerald gem beryl can be found in significant quantities in Manitoba, Ontario, Quebec, NWT, and Nova Scotia.

This map shows the distribution of significant gem beryl occurrences of Canada, based on map by B. Wilson.

**OPTIONAL READINGS**

For an exhaustive list, the books "*Emerald and Other Beryls*" and "*Gemstones of North America*" both by John Sinkankas (UBC Library Call Numbers QE394.E5 S56 1981 and QE392.5.N6 S5 1959, respectively) are wonderful resources. More recent publications include provincial summaries by local Geological Surveys, such as the British Columbia Geologic Survey's "[Potential for Emeralds in B.C.](https://connect.ubc.ca/bbcswebdav/pid-2559966-dt-content-rid-10494322_1/courses/SIS.UBC.EOSC.118.99C.2014WC.44220/Course_Files/moduleB/lesson15/download/Legun-Potential-for-emeralds.pdf)" by A. Legun or L. Walton's publication "[Exploration Criteria for Coloured Gemstone Deposits in the Yukon"](https://connect.ubc.ca/bbcswebdav/pid-2559966-dt-content-rid-10494322_1/courses/SIS.UBC.EOSC.118.99C.2014WC.44220/Course_Files/moduleB/lesson15/download/Walton-Coloured-Gemstones-Yukon.pdf).