Module B. Colour from the Cosmos

Lesson 15: Beryl Geology and Geography

*Pegmatites*

Beryl is common in granitic pegmatites and its gem varieties (i.e., aquamarine, heliodor, morganite, andgoshenite) are typically found within rare-element-enriched pegmatites. Rare elements common in these types pegmatites include lithium (Li), cesium (Cs), tantalum (Ta), niobium (Nb), Be, and sometimes yttrium (Y) and flourine (F). Pegmatites can also exchange other elements from the "wall rocks" that they intrude into and come in contact with. Commonly, this is how non-pegmatite related elements, such as Cr and V, are introduced into these rocks which then allow ever more rare mineral and gem varieties to form (e.g., Paraiba tourmaline and emerald).

Pegmatites typically have a concentric structure, similar to the layers of an onion. The zones, listed from outside inwards, are called Border, Wall, Intermediate, and Core (see figure below). Beryl has been found from the Border Zone to the Core, but the highest quality crystals (i.e., large size, good transparency, and colour) typically reside in open space cavities or pockets of the Core Zone.

Cartoon showing a cross section of a single complex pegmatite.

Other gem minerals commonly found in these zones include albite, spodumene, tourmaline, and quartz. Exceptional specimens found in pegmatitic environments are the result of many factors, including extreme crystal fractionation, volatile increases, and long term geologic stability. We'll touch on pegmatites later in a lesson devoted entirely to the gem minerals found in these special rocks.