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Magmatic and Metamorphic Gem Deposits and Their Potential in British Columbia

Most coloured gemstones form near the earth's surface in a wide range of different environments; for example, they can crystallize from igneous magmas or hydrothermal solutions, or via the recrystallization of pre-existing minerals during metamorphism. The specific environment determines the types of gem minerals that form, as well as their physical and chemical properties. Gem deposits are of scientific interest because they represent unusual geologic and geochemical conditions; for example, emeralds are rare because they require beryllium and chromium (and/or vanadium), which generally travel in very different geochemical circles. Scientific studies also provide clues which can be used to explore for similar types of gem deposits.

Canada is the second largest country in the world and should host numerous coloured gem deposits. However exploration is hampered by very low population densities, climate, and a lack of a lack of infrastructure hindering access to most prospective areas. Despite this, a number of discoveries have been made, especially in the last two decades: these include ruby (British Columbia), emerald (Ontario, the Northwest and Yukon Territories, and Nunavut), and sapphire (British Columbia and Nunavut). Scientific study of these occurrences has generated guidelines for future exploration. New technologies such as drones – currently being used to successfully explore for peridot in British Columbia – and hyperspectral imaging will likely lead to more discoveries in the future.