

Mining in British Columbia

Industrial Mineral, Metal and Coal Operations in British Columbia



Industrial Mineral and Metal Symbols

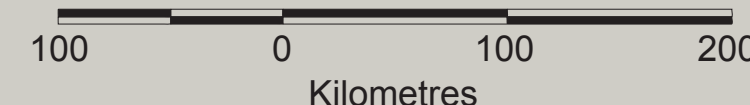
Ag	Silver	Jd	Jade
An	Andesite	Ls	Limestone
At	Aggregate (sand and gravel)	Ma	Magnetite
Au	Gold	Mo	Molybdenum
Ba	Barite	Mr	Marble
Bn	Bentonite	Mt	Magnesite
Bs	Basalt	Op	Opal
Cy	Clay	Pu	Pumice
Cu	Copper	S	Sulphur
Di	Diorite	Sc	Scoria
Do	Dolomite	Sg	Slag
Fc	Fireclay	Sh	Shale
Fr	Fuller's Earth	Si	Silica
Fs	Flagstone	Sl	Slate
Ga	Gabbro	Ss	Sandstone
Gn	Gneiss	Tu	Tufa
Gr	Granite	Ze	Zeolite
Gy	Gypsum	Zn	Zinc

(^{At}) indicates mineral resource also used as aggregate

Operation and Geographic Symbols

●	Industrial Mineral Mine/Quarry	🌊	Lake
●	Sulphur Producer	🏞️	River
○	Metal Mine	---	Province, Territory or State Border
○	Coal Mine	---	Morphogeological Belt Boundary
+	Seasonal Production	△	Zinc Smelter
■	City/Town		
△	Aluminum Smelter		

Scale

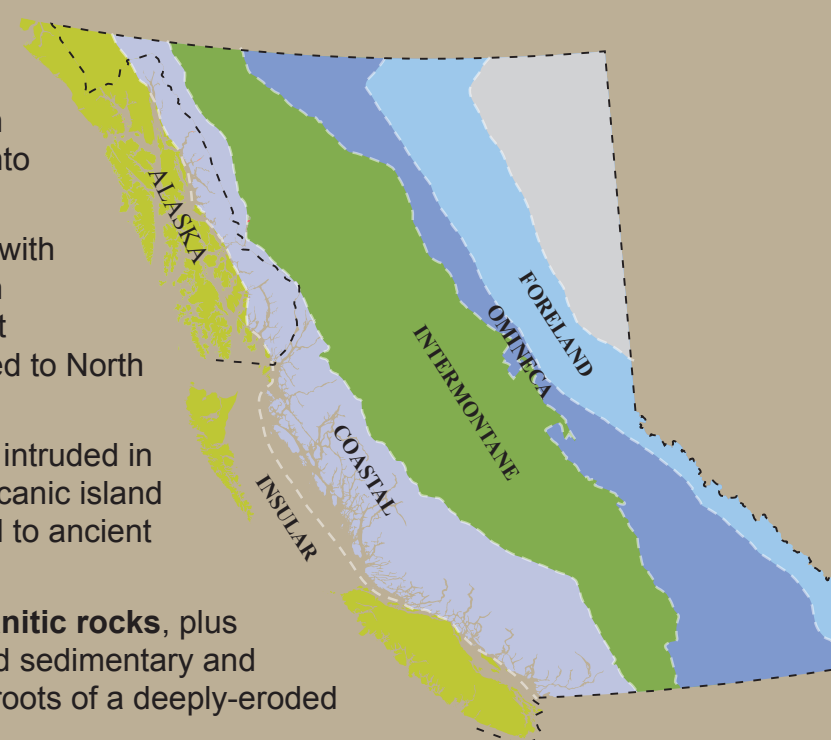


The Five Belt Framework of the Canadian Cordillera

British Columbia lies in the *Cordilleran Orogen* (kord-(y)er-uhn or-uh-jen), a mountain belt that runs along the western edge of the Western Hemisphere continents from Alaska to Antarctica. These mountains formed over tens of millions of years as a result of tectonic collisions between the continents and crustal plates located in what is now the Pacific Ocean basin. The crustal plates included slivers (terrane) of volcanic islands, ocean floor and other small continents that collided with and remained stuck onto (accreted) the margins of the continents. These mountain-building collisions were marked by igneous intrusions and volcanism, deformation (folding, faulting, and metamorphism) and uplift.

In British Columbia the Canadian Cordillera is made up of five, northwest-trending *morphogeological belts*: *Foreland*, *Omineca*, *Intermontane*, *Coastal* and *Insular*. They are defined by their distinct geology and the mountain-building processes that formed them, and are separated from each other by faults. Geoscientists have determined that the rocks in the *Foreland* belt formed along the edge of ancient *North America*. However, rocks forming the belts further west formed elsewhere and were accreted to the continent between 185 and 50 million years ago. The unique geological characteristics and mountain-building history of each belt determine the mineral resources each one contains.

- **Foreland Belt**, represented by the Rocky Mountains, is made up mostly of a great thickness (>15 km) of ancient **sedimentary rocks**. Most are between 700-50 million years old, but some are up to 1.5 billion years old. They are composed of sediment that was eroded from and deposited along the western edge of the ancient continent. During mountain building they were thrust eastwards for at least 150 km onto the continent.
- **Omineca Belt**, represented by several northwest-trending mountain ranges, is made up mostly of folded and faulted **metamorphic rocks** with lesser amounts of granitic rock. Most of these metamorphic rocks formed from pre-existing sedimentary rocks. Some of these are similar in composition to sedimentary rocks in the *Foreland*, while others are more similar to those in the *Intermontane*. This complexly deformed belt represents the exposed roots of a deeply-eroded mountain chain. It marks a collision zone that formed when the *Intermontane* was accreted to North America.
- **Intermontane Belt**, a region of high plateaus and rolling uplands, is made of ancient to Recent **volcanic and sedimentary rocks** that are intruded in many areas by granitic rocks. The oldest of the volcanic and sedimentary sequence (370-180 million years) represents ocean floor and volcanic island arc terranes that formed offshore and were accreted during middle Jurassic time (165-172 million years ago). The granitic rocks are related to ancient island arc volcanism and to later accretion of *Insular* belt rocks.
- **Coast Belt** includes the Coast and Cascade mountains and extends up to the Yukon. It is made up mostly of 185 to 50 million year old **granitic rocks**, plus scattered remnants of older, deformed sedimentary and volcanic bedrock into which the granitic bodies have intruded. (Similar, undeformed sedimentary and volcanic rocks occur in both the *Intermontane* and *Insular* belts.) Similar to the *Omineca*, this belt marks a collision zone. It represents the roots of a deeply-eroded volcanic mountain chain that formed during accretion of *Insular* belt rocks to North America.
- **Insular Belt** includes Vancouver Island, the Queen Charlotte Islands, and the bedrock forming the seafloor out to the toe of the continental slope about 100 km west of Vancouver Island. It is made up mostly of ancient (350-180 million years) **volcanic and sedimentary rocks**, which are intruded locally by granitic rocks. Like those in the *Intermontane*, the volcanic and sedimentary rocks represent exotic terranes that formed out in the ocean basin and were accreted to the continent by mid-Cretaceous time (100-115 million years ago).



The variety and distribution of mineral resources in British Columbia are directly related to the province's complex and unique geology. Some of these resources, such as limestone, occur and are mined in many regions around BC. Others occur or predominate in only certain morphogeological belts as dictated by their bedrock geology and the mountain-building processes that overprint them (Dawson, K. M., et al., 1991). Major coal deposits, for example, are predominant in the sedimentary sequences of the *Foreland* and *Insular* belts, while economic copper-molybdenum porphyry deposits are predominantly associated with granitic intrusions in the *Intermontane*. Where BC's mineral resources are discovered depends on geology. Where they are extracted depends on economic, logistical, and environmental considerations.

For more information on supplementary activities and to explore the interactive BC's Mineral Resources map, developed by MineralsEd, visit: www.MineralsEd.ca/CurrentOperations.aspx

This poster shows all current operating metal and coal mines and all major and some minor industrial mineral operations. It does not show gemstone locations or the numerous sand and gravel aggregate operations around the province. Alternate names for select operations are denoted in italicized square brackets. This poster was produced by the MineralsEd using map data supplied by the BC Geological Survey branch (www.empr.gov.bc.ca/MINING/GEOSCIENCE/Pages/default.aspx) of the Ministry of Energy and Mines (www.gov.bc.ca/ener/index.html).

For additional information on industrial mineral, metal and coal operations in B.C., visit the MineralsEd Web site at: www.MineralsEd.ca.

Bibliography:
 Grieve, D., Madu, B., Northcole B., Wojdak, P., Fredericks, J., Meredith-Jones, S., Desjardins, P. 2011. *Operating Mines and Selected Major Exploration Projects in BC, 2010*. Victoria, BC: British Columbia Ministry of Forests, Mines and Lands.
 Fredericks, J., Grieve, D., Lefebvre, D., Madu, B., Northcole, B., Wojdak, P. 2010. *British Columbia mining and mineral exploration overview 2009*. Victoria, BC: British Columbia Ministry of Energy, Mines and Petroleum Resources.
 Grieve, D., Madu, B., Northcole, B., Wojdak, P., Fredericks, J., Meredith-Jones, S., Saunders, P. 2010. *Operating Mines and Selected Major Exploration Projects in British Columbia 2009*. Victoria, BC: British Columbia Ministry of Energy, Mines and Petroleum Resources.
 MINFILE mineral inventory: 2010. British Columbia Ministry of Energy, Mines and Petroleum Resources. <http://minfile.gov.bc.ca/>
 Cordilleran geoscience - the five belt framework of the Canadian Cordillera. 2008. Geological Survey of Canada. http://gsc.nrcan.gc.ca/cordgeobelts_e.php
 The MapPlace. 2008. British Columbia Ministry of Energy, Mines and Petroleum Resources. <http://www.mapplace.ca>
 Grieve, D., Lane, R., Madu, B., Northcole, D., Schroeter, T., Simandl, G. J., Webster, I., Wojdak, P. 2007. *Industrial minerals in British Columbia - 2006 review (Information circular 2007-2)*. Victoria, BC: British Columbia Ministry of Energy, Mines and Petroleum Resources.
 Grieve, D., Lane, R., Madu, B., Northcole, B., Schroeter, T., Wojdak, P. 2007. *British Columbia mining and mineral exploration overview 2006*. Victoria, BC: British Columbia Ministry of Energy, Mines and Petroleum Resources.
 Cathro, M., Grieve, D., Lane, R., Pardy, J., Schroeter, T., Wojdak, P. 2006. *British Columbia mines and mineral exploration overview 2005*. Victoria, BC: British Columbia Ministry of Energy, Mines and Petroleum Resources.
 Cathro, M., Grieve, D., Lane, R., Pardy, J., Ryan, B., Schroeter, T., Simandl, G., Wojdak, P. 2005. *British Columbia mining and mineral exploration overview 2004*. Victoria, BC: British Columbia Ministry of Energy, Mines and Petroleum Resources.
 Pardy, J. W., Schroeter, T. G. 2004. *Operating mines in British Columbia and major exploration and development projects in 2004 - preliminary estimates (GeoFile 2004-10)* [map]. British Columbia Ministry of Energy, Mines and Petroleum Resources.
 Dawson, K. M., Panteleyev, A., Sutherland Brown, A. and Woodsworth, G. J. 1991. Regional metallogeny. In *Geology of the Cordilleran Orogen in Canada*, ed. H. Gabrielse and C. J. Yorath. The Geology of Canada, 4:707-768. Geological Survey of Canada.

© 2013 MineralsEd
 (Mineral Resources Education Program of BC)
 900-808 W. Hastings St., Vancouver, BC V6C 2X4
 T: 604-682-5477
 W: www.MineralsEd.ca
 INTENDED FOR EDUCATIONAL USE ONLY.



6th Edition. Edited Sept 2013.