Proterozoic rocks have their greatest thickness of 13,720 feet, and consist dominantly of siliceous dolomites and argillites with lesser amounts of quartzites, and one important sheet of basaltic lava. Lower, Middle and Upper Cambrian, and early Ordovician rocks occur in the Rocky Mountains and Upper Ordovician (Richmond) limestones in the Mackenzie Mountains. Silurian sediments are widespread, but the early Devonian was apparently a time of withdrawal of the sea from the Region as no strata of that age have been recognized. Middle and Upper Devonian limestones and shales are fairly widespread in both the Rocky Mountains and Mackenzie River region. Carboniferous beds overlie Devonian strata conformably in the Rockies, and Permian strata have been recognized on the Liard and Peace Rivers.

Triassic marine beds occur along the eastern flank of the Rocky Mountains, and in the eastern ranges are succeeded by Jurassic marine strata. At the close of the Cretaceous and extending into Paleocene time the Rocky Mountain area was subjected to orogenic forces that produced folding and over-thrusting from west to east, the Laramide revolution. Peneplains were developed in both the Rocky and Mackenzie Mountain areas during Tertiary time, and the present altitude of the Region is due to late Tertiary uplift. In Pleistocene time much of the area of the Eastern System was glaciated, but parts apparently remained free of ice.

The geology of the Western Cordilleran Belt is complex. The oldest rocks are of Precambrian age. The Shuswap rocks consisting of schists, crystalline limestones, gneisses and granitized varieties were at one time regarded as all of Archæan age. It is now known that these rocks are highly metamorphosed formations of mainly Late Precambrian and early Palæozoic ages. The Yukon group of the Yukon Plateau, consisting of schists, gneisses, crystalline limestone and greenstone, the Wolverine complex of central British Columbia, and the Cariboo Series of the Cariboo district, are also at least partly of Late Precambrian age, but Lower Cambrian fossils have been found near the top of the latter two. In southeastern British Columbia the Purcell Series consisting of 45,000 feet of quartzites and argillites is of early Proterozoic age, and is overlain unconformably by late Proterozoic sediments of the Windermere Series, 22,000 feet thick, consisting of conglomerate, slate, limestone, greenstone, schist and paragneiss. The Purcell and the Windermere strata are intruded by basic sills and dykes.

The Palæozoic record is fragmentary. Cambrian, Ordovician, Silurian and Devonian beds are all known locally. In Carboniferous and Permian times great thicknesses of sedimentary and volcanic rocks accumulated under marine conditions over much of the belt; in central British Columbia the Cache Creek group probably reaches a thickness of more than 25,000 feet.

Mesozoic strata range in age from Upper Triassic to Upper Cretaceous. The Triassic and Jurassic periods were marked by intense volcanism, but the contact between the two systems is only locally discordant. Jurassic rocks are widely distributed: the Laberge Series of Yukon has a thickness of 10,000 feet, and the Jurassic members of the Hazelton and Takla groups of central British Columbia are each probably just as thick. Lower Cretaceous strata are also widespread.

The Mesozoic era was a time of orogeny and of great, deep-seated igneous activity; the largest intrusive mass, that of the complex Coast intrusions, is 1,100 miles long and averages more than 50 miles wide. It comprises many phases, ranging in age from Triassic to Tertiary but chiefly late Jurassic to early Cretaceous, and varies in composition from granite to gabbro, the commonest types being