The Snoqualmie pass area lies about 50 mi (80 km) east of Seattle, Washington, along the crest of the Cascade Range. Five stratified units, forming a composite section over 22,000 ft (6700 m) thick, are recognized in the area. They were deformed and later intruded by granodiorite and quartz monzonite porphyry of the Snoqualmie batholith (middle Miocene). The oldest unit, the Denny Formation (Permian), 7000 ft (2100 m) thick, consists of interstratified basalt, andesite and dacite volcanic rocks and limestone and chert beds. This formation is unconformably overlain by a thick conformable sequence of early Tertiary strata which are
subdivided, from oldest to youngest, into the Guye Formation, Mount Catherine Tuff, and Naches Formations (Paleocene to early Oligocene). The Guye Formation, 6500 ft (1980 m) thick, consists of carbonaceous mudstone, quartzofeldspathic siltstone and sandstone, and chert conglomerate. The Mount Catherine Tuff, 900 ft (274 m) thick, consists of interstratified dacitic and rhyolitic crystal-vitric welded tuff. The Naches Formation, more than 6000 ft (1830 m) thick, is composed of carbonaceous mudstone and quartzofeldspathic siltstone and sandstone with interstratified andesitic lava and pyroclastic rock. The Denny Mountain Formation, informally named, 1800 ft (550 m) thick, (Oligocene or early Miocene) overlies the Guye Formation along a major angular unconformity. This unit consists of interstratified dacitic and andesitic tuff, volcanic breccia, and intercalated andesitic lava.

The rocks of all stratified formations except the Denny Mountain Formation were deformed at different times before emplacement of the Snoqualmie batholith. During batholithic emplacement, four stages of deformation are recognized: (1) development of an anticline in the Guye, Mount Catherine Tuff, and Naches Formations, (2) break-up of this anticline and downfaulting of limbs with displacements up to 2 mi (3.2 km), (3) uplift of blocks of the Denny Formation and juxtaposition of these with younger formational units, and (4) uplift of additional blocks of the Denny Formation along trends that cut obliquely across stratigraphic contacts and previous structural trends.

Intrusion of the Snoqualmie granodiorite and quartz monzonite porphyry into limestone beds of the Denny Formation has formed local deposits
of skarn containing principally magnetite and lesser amounts of chalcopyrite.