

Geology of Northeastern Victoria Land, Antarctica

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Abstract: The northeastern corner of Victoria Land — an area of 50,000 square kilometers east of the Rennick Glacier and north of the Newnes Ice Shelf — was studied geologically during a helicopter-supported reconnaissance in 1964, extending and refining previous work by New Zealand geologists.

The oldest rocks of the region are the plutonic rocks of the Freyberg Mountains and other ranges in the southwest part of the region. These schists, gneisses, migmatites, and granitic rocks are presumed to be correlative with the late Precambrian and early Paleozoic terrane of the Transantarctic Mountains.

Lying east of these plutonic rocks are low-grade metamorphosed clastic sedimentary rocks presumed to be of middle Paleozoic age; the steep contact with the plutonic rocks appears to be a sheared unconformity. The basal (?) formation, polymict conglomerate and black slate, forms a northwest-trending outcrop belt 10 km wide of steeply dipping rocks. Further northeast and presumably next higher stratigraphically is quartzite and quartz conglomerate, forming an outcrop belt 8–15 km wide. The remaining metasedimentary rocks belong to the Robertson Bay Formation of metasilstone and metagraywacke, tightly folded about northwest-trending axes and forming an outcrop belt 150 km wide, from the Millen Range to Robertson Bay. Numerous stocks and small batholiths of hornblende-biotite granodiorite intrude and bake the Robertson Bay Formation.

The continental Beacon Sandstone, intruded by thick dikes and sills of Jurassic (?) diabase, overlies the older rocks of the southwestern part of the region, and has been broken by normal faults and folded gently. The Beacon is in turn overlain by plateau basalts.

Late Cenozoic basalt-trachyte volcanism along the Ross Sea coast has formed large, north-trending Adare, Hallett, and Daniell Peninsulas and similar Coulman Island. Each of these masses consists largely of volcanic rocks extruded beneath ice sheets at least as thick as 1500 m; the continental ice cap was much more extensive at times past than it is now. The volcanic rocks are chaotic palagonite breccias, flow breccias, pillow lavas, and complexes intrusive into them. Subaerial calderas, flows, and cones formed along the crestal rift zones.

The pre-Tertiary rocks are upraised along faults at the edge of the Ross Sea. Peaks reaching altitudes of 4000 m near the coast attest to the magnitude of late Cenozoic uplift.