Natural Resources Canada / Ressources naturelles Canada

GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA

NATMAP
CARTNAT
Canada's National Geoscience Mapping Program
La Programme national de cartographie géoscientifique du Canada

DESCRIPTIVE NOTES

INTRODUCTION

This Half Way Hills and Whitehills Lake map is one of a group of new 1:series bedrock geology maps arising from the NATMAP Bathurst Project (1996-2001). The map area is located in the Churchill Province of the Canadian Shield, and is dominated by orogenic metasediments, felsic intrusions, and metamorphic domes. The area is part of the Rae Province, north of the regional geophysical anomaly discussed by Hoffman (1988) as a major crater-shaped suture, the Snowbird tectonic zone (Fig. 1). The Woodburn Group, which is the dominant supracrustal assemblage in the Bathurst Project area, is interpreted as an extensive metasedimentary wedge derived from the Hearne Province, Thelon Tectonic Zone, and Rae Province, and deposited in a foreland basin during the Ketilidian orogeny (Henderson, 1985; Tirrul and Grant, 1991; Tirrul, 1992; Grant, 1992).

The Woodburn accretionary wedge comprises multiple cycles of turbidic volcanic rocks, associated intrusions, and overlying metasediments. Detrital zircon ages from the Woodburn Group suggest that the Ketilidian orogeny was active spanning approximately from Schultz Lake to Bathurst Inlet, beyond the Wollaston and Dubawnt rifts (Fig. 3). The supracrustal rocks are cut by a substantial suite of 1.8-1.7 Ga granitic and volcanic intrusions, which are interpreted as the Ketilidian orogenic arc. The Ketilidian orogenic arc is well-developed in the Bathurst Project area, and is characterized by a 1.8 Ga regional high-grade metamorphic event, and by a 1.8-1.7 Ga regional low-pressure, high-temperature metamorphic event. The Ketilidian orogenic arc is well-known for its Paleoproterozoic gold mineralization, and associated faults that resulted in dismantling of volcanic rocks, basement, and quartzite and graphitic pelites. The Ketilidian orogenic arc is interpreted as a Andean-type arc, with a subduction zone dipping to the south-southeast beneath the Hearne Province. The Ketilidian orogenic arc is cut by 1.7 Ga to 1.6 Ga post-orogenic alkali-calcic granites, and associated mineralization.

The Bathurst Project area is dominated by Archean to Paleoproterozoic granitoid rocks, which are interpreted as being derived from supracrustal rocks similar to those of the Hearne Province, and deposited in a foreland basin during the Ketilidian orogeny. Detrital zircon ages from the Woodburn Group suggest that the Ketilidian orogenic arc was active from approximately Schultz Lake to Bathurst Inlet, beyond the Wollaston and Dubawnt rifts (Fig. 3). The Ketilidian orogenic arc is well-developed in the Bathurst Project area, and is characterized by a 1.8 Ga regional high-grade metamorphic event, and by a 1.8-1.7 Ga regional low-pressure, high-temperature metamorphic event. The Ketilidian orogenic arc is well-known for its Paleoproterozoic gold mineralization, and associated faults that resulted in dismantling of volcanic rocks, basement, and quartzite and graphitic pelites. The Ketilidian orogenic arc is interpreted as a Andean-type arc, with a subduction zone dipping to the south-southeast beneath the Hearne Province. The Ketilidian orogenic arc is cut by 1.7 Ga to 1.6 Ga post-orogenic alkali-calcic granites, and associated mineralization.

STRATIGRAPHY OF THE HALF WAY HILLS AND WHITEHILLS LAKE AREA

Half Way Hills Inset map

The inset map in the area form a Mesoarchean basement complex that extends south of Baringsbjuk lake to the Whitehills Lake area. Mesoarchean basement rocks are dominated by tonalitic gneisses, with minor granitic gneisses, and rare mafic to ultramafic rocks. Mesoarchean gneisses are cut by 2.8 Ga dykes of Queen Maud Gabbro, and by 2.7 Ga dykes of Amer Group. Locally, the Mesoarchean basement complex includes banded mafic and felsic gneiss and 2Ga intrusions. The Mesoarchean basement complex is in contact with Paleoproterozoic Woodburn Group metasediments, and is overlain by Paleoproterozoic Amaruk Formation. The Amaruk Formation is a thick, laterally extensive, quartzite, and is overlain by Paleoproterozoic Baringsbjuk Formation. The Baringsbjuk Formation is a thick, laterally extensive, mafic to felsic volcanic rock, and is overlain by Paleoproterozoic Woodburn Group metasediments. The Woodburn Group metasediments are dominantly turbidites, and are cut by 1.8 Ga Ketilidian intrusions. The Ketilidian intrusions are cut by 1.7 Ga post-orogenic alkali-calcic granites, and associated faults that resulted in dismantling of volcanic rocks, basement, and quartzite and graphitic pelites. The Ketilidian intrusions are also cut by 2.7 Ga dykes of Amer Group, and by 1.2 Ga dykes of Mackenzie Igneous Events. Diabase dykes of the Mackenzie Igneous Events are the youngest bedrock in the map area.

Supracrustal rocks in the map area have been previously assigned to the Woodburn Group and "Amaruk Group" by Taylor (1982). In past usage, the two groups not only dealt with other with no clear distinction between their constituent rocks, but the Amaruk Group was commonly considered to be younger than the Woodburn Group. Recent work in the Bathurst Project area, however, has established that the Amaruk Formation is a laterally extensive, quartzite, and is overlain by the Baringsbjuk Formation, which is a thick, laterally extensive, mafic to felsic volcanic rock. The Baringsbjuk Formation is in turn overlain by Woodburn Group metasediments, which are cut by 1.8 Ga Ketilidian intrusions. The Amaruk Formation is in contact with Mesoarchean basement rocks, and is cut by 2.8 Ga Queen Maud Gabbro and 2.7 Ga dykes of Amer Group. The Amaruk Formation is not in contact with the Woodburn Group, which is in contact with the Baringsbjuk Formation. The Baringsbjuk Formation is in contact with the Woodburn Group, which is in contact with the Amaruk Formation. The Woodburn Group is in contact with the Baringsbjuk Formation