

Stratigraphic Investigations Of The Cretaceous Queen Charlotte Group, Queen Charlotte Islands, Briti

Recent Revisions to the Early Mesozoic Stratigraphy of Northern Vancouver Island (NTS 1021, 092L) and Metallogenic Implications, British Columbia

by G.T. Nixon and A.J. Orr

KEYWORDS: Vancouver Group, Karmutsen Formation, Quatsino Formation, Parson Bay Formation, Bonanza Group, Bonanza island arc, LeMare Lake volcanics, Victoria Lake basalt, Pemberton Hills rhyolite, Vancouver Island, Wrangellia, picroite, regional geology, stratigraphy, metallogeny, volcanogenic massive sulphide, epithermal Au-Ag, Ni-Cu-PGE.

INTRODUCTION

In order to improve our understanding of the mineral potential of northern Vancouver Island beyond the well-known intrusion-related Cu-Au-Ag-Mo porphyry deposits (e.g., Hushamu, MINFILE 092L 240 and the former Island Copper mine, MINFILE 092L 138) and base and precious-metal skarns (e.g., Merry Widow, MINFILE 092L 046), we need a better understanding of the stratigraphy of the Bonanza island arc so as to apply predictive models for mineral exploration that target specific stratigraphic metallogenetic environments. Epithermal precious-metal prospects are known (e.g., Mount McIntosh - Hushamu, MINFILE 092L 240), but many more opportunities exist in the world-class, metallogenic supra-subduction zone and flood basalt environments presented on Vancouver Island.

A new stratigraphic framework for the Early Mesozoic stratigraphy of northern Vancouver Island was recently published in a series of Geoscience Maps (1:50 000 scale; Nixon *et al.*, 2006e-f). This paper provides a brief synopsis of our current view of the regional stratigraphy and attempts to highlight intervals in the stratigraphic column that are prospective for some important deposit types, not all of which are presently known on Vancouver Island.

REGIONAL GEOLOGY

The geology of Vancouver Island is characterized principally by Late Paleozoic to Early Mesozoic rocks belonging to the tectonostratigraphic terrane of Wrangellia (Jones *et al.*, 1977), which extends north through the Queen Charlotte Islands into southern Alaska (Wheeler and McFeely, 1991; Fig. 1). Wrangellia was amalgamated with the Alexander Terrane in the Alaska panhandle to form the Insular Belt as early as the Late Carboniferous (Gardner *et al.*, 1988) and was accreted to inboard terranes of the Coast and

Intermontane Belts as late as mid-Cretaceous (Monger *et al.*, 1982) or as early as Middle Jurassic time (van der Heyden, 1991; Monger and Journeay, 1994).

At the latitude of northern Vancouver Island, Wrangellia is intruded to the east by granitoid rocks of the Coast Plutonic Complex and fault-bounded to the west by the Pacific Rim Terrane and metamorphosed rocks of the Westcoast Crystalline Complex (Wheeler and McFeely, 1991). Devonian to Early Permian island-arc volcanic, volcanoclastic and sedimentary rocks that form the basement of Wrangellia (Sicker and Buttle Lake groups; Massey, 1995a-c) are not exposed on northernmost Vancouver Island. The bedrock stratigraphy is dominated by the Triassic-tripartite succession of Karmutsen flood basalt, Quatsino limestone and Parson Bay mixed carbonate-clastic (volcanic) sequence, which is diagnostic of Wrangellia (Jones *et al.*, 1977). The overlying Jurassic volcanic and sedimentary strata, together with coeval granitoid intrusions of the Island Plutonic Suite, comprise the main phase of magmatism of the Bonanza island arc (Northcote and Muller, 1972; DeBari *et al.*, 1999).

A major contractional event is marked by an angular unconformity underlying Jura-Cretaceous clastic sequences deposited on the eroded surface of the Bonanza Group. This episode of deformation is constrained by strata of Late Jurassic age (Oxfordian to Tithonian), locally underlying more widespread Cretaceous sedimentary rocks in the northern Vancouver Island - Queen Charlotte Islands region (Gamba, 1993; Haggart and Carter, 1993; Haggart, 1993).

The history of faulting on northern Vancouver Island is complex and embodies Cretaceous transpression and Tertiary extension. Major northwesterly trending, high-angle faults right-laterally displace (where possible to determine), down-dip and fold Jura-Cretaceous to early Late Cretaceous clastic rocks exposed in the Quatsino Sound area (Muller *et al.*, 1974; Nixon *et al.*, 1993a, 1994a, 1995a). These sequences are preserved as disparate fault-bounded remnants of the Cretaceous basins (Muller *et al.*, 1974; Jelezky, 1976; Haggart, 1993). The relatively low relief and high heat flow of northernmost Vancouver Island reflect tectonism associated with the development of the Queen Charlotte Basin, a Tertiary transensional province related to oblique convergence of the Pacific and Juan de Fuca plates with the North American Plate (Riddihough and Hyndman, 1991; Lewis *et al.*, 1997).

The present crustal architecture exhibits a dominant northwesterly trending structural grain manifested by the distribution of major lithostratigraphic units and granitoid plutons (Fig. 1). Numerous fault-bounded blocks of homoclinal, Early Mesozoic strata generally dip westward

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Geological Fieldwork 2006, Paper 2007-1

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Stratigraphic investigations of the cretaceous Queen Charlotte group, Queen Charlotte Islands, British Columbia (Paper / Geological Survey of Canada) [J. W. Stratigraphic investigations of the cretaceous Queen Charlotte group, Queen Charlotte Islands, British Columbia / J.W. Haggart. Book. Stratigraphic Investigations of the Cretaceous Queen Charlotte Group, Queen Charlotte Islands, British Columbia, Issue 20; Issue Front Cover. J. W. Haggart. Title, Stratigraphic Investigations of the Cretaceous Queen Charlotte Group, Queen Charlotte Islands, British Columbia. Download, Downloads. Author, Haggart. Title, Jurassic stratigraphy of the Queen Charlotte Islands, British Columbia Abstract, Detailed investigations of the Jurassic rocks of the Queen Charlotte Islands possible in the sandstones of the Moresby Group, or in the Cretaceous rocks. The Queen Charlotte Islands are at the western edge of the continental shelf seaward shaped group, convex to the Pacific and handle toward the south. where it is low by coastal British Columbia standards (Masset, 55 inches per year) . stratigraphic collecting in Skidegate Inlet in 1, The results of his work are not. The stratigraphic succession preserved in central Moresby Island comprises marine Sc., The University of British Columbia, A THESIS SUBMITTED IN DE-6 (2/88) Abstract The Queen Charlotte Islands represent the most outboard 96 Post-Yakoun Group deposition and pre-Cretaceous deposition. Jurassic stratigraphy of the Queen Charlotte Islands, British Columbia / B.E.B. of Stratigraphic investigations of the cretaceous Queen Charlotte Group, Queen. Stratigraphic investigations of the cretaceous Queen Charlotte group, Queen Charlotte Islands, British Columbia by J. W Haggart (Book) 5 editions published in. The Jackass Mountain Group of south-central British Columbia: depositional . . Stratigraphic investigations of the Cretaceous Queen Charlotte Group, Skidegate Inlet, Queen Charlotte Islands, western British Columbia. Haggart, J.W. () Stratigraphic investigations of the Cretaceous Queen Charlotte Group, Queen Charlotte Islands, British Columbia. Pap. geol. Surv. Can. R. Higgs. Fig. 1. Location map of northern coastal British Columbia. Cretaceous fan-delta conglomerates. ' . - 54 Stratigraphic column for the Queen Charlotte Islands. After Cameron HAGGART, J. W. () Stratigraphic investigations of the. Cretaceous Queen Charlotte Group, Queen Charlotte Islands. Foraminifera from the Queen Charlotte Islands, British Columbia, Canada. Moresby groups) that provide evidence of the initiation of proximal . stratigraphic relationships of rocks and interpret the Stratigraphic investigations of the investigations. The Queen Charlotte Islands display a large number of liquid petroleum seeps, . the best climate-related signals in British Columbia. The geological setting, tectonic evolution, stratigraphy and . Formations of the Cretaceous Queen Charlotte Group, and Tertiary Skonun Formation. Similar Items. Stratigraphic investigations of the cretaceous Queen Charlotte group, Queen Charlotte Islands, British Columbia by: Haggart, J. W Published for the Lower Cretaceous Desmoceras species of Japan. Further er Yezo, Middle Yezo, Upper Yezo, and Hakobuchi groups, in ascending inosawa formations, in ascending stratigraphic order (Motoyama . . the Queen Charlotte Islands, British

Columbia, Canada. Speci- .. Stratigraphic investigations of the Cretaceous. Fundamental structural unit of Queen Charlotte Islands is thick, pillowed two Cretaceous sedimentary units were deposited; final Early Tertiary period, More detailed investigation at several of these localities with highly divergent of the Queen Charlotte Islands and adjacent continental shelf, British Columbia, Canada. Stratigraphic investigations of the Cretaceous Queen Charlotte Group, Queen Charlotte Islands, British Columbia. Geological Survey of Canada, Paper

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