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Molluscan biostratigraphy and paleomagnetism of Campanian strata, Queen Charlotte Islands, British Columbia: implications for Pacific coast North America biochronology

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ABSTRACT

A previously uncollected fauna of ammonites, bivalves, and other molluscs, associated with radiolarian microfossils, has been newly recognized near Lawn Hill on the east coast of central Queen Charlotte Islands, British Columbia. The regional biostratigraphic zonation indicates that the Lawn Hill fauna is correlative with the *Nostoceras hornbyense* zonule of the *Pachydiscus suciaensis* ammonite biozone, recognized in the Nanaimo Group of southeast Vancouver Island. The *Nostoceras hornbyense* Zone (new) is herein proposed for strata of Pacific coast Canada containing the zonal index. Several molluscan taxa present in the Lawn Hill section are new to British Columbia and the ammonite fauna suggests that the *Nostoceras hornbyense* Zone is late Campanian in age, supported by radiolarian taxa present in the section. Strata sampled in the Lawn Hill section preserve reversed-polarity magnetization, considered likely correlative with Chron 32r. The presence of the *Nostoceras hornbyense* Zone on Queen Charlotte Islands is the first recognition of this zone in Canada north of central Vancouver Island and represents the youngest Cretaceous known in this region. Campanian radiolarians identified from the Lawn Hill section are also the first recognized from the Pacific coast of Canada.

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1. Introduction

Cretaceous strata are distributed widely across Queen Charlotte Islands, British Columbia (Haggart, 1991, 2004), with major outcrop belts found in the Langara Island to White Point region on the northwest coast, and in the Skidegate Inlet and Cumshewa Inlet areas of the central part of the islands (Fig. 1). Cretaceous strata are inferred to be distributed also in the offshore regions adjacent to Queen Charlotte Islands and collectively, these deposits accumulated in the Hecate basin (Hunt, 1958; Haggart, 1993; Mossop et al., 2004), inferred to have developed in a fore-arc setting westward of an active magmatic arc (Haggart, 1991, 1993; Higgs, 1991; Thompson et al., 1991; Lewis et al., 1991; Lyatsky and Haggart, 1993).

The Hecate basin accumulated on a varied topography of older Mesozoic and Paleozoic(?) sedimentary, volcanic, and plutonic rocks collectively assigned to the Insular belt. This feature is one of several morphogeological provinces of the Canadian Cordilleran region and includes the offshore island systems of western British Columbia and Alaska, including the island systems of Queen Charlotte Islands and Vancouver Island in British Columbia, and parts of the southeastern Alaska archipelago (Fig. 1).

The principal geological components of the Insular belt are the Wrangellia and Alexander terranes, the former well developed on Queen Charlotte Islands, the latter in southeast Alaska. The Baja British Columbia ("Baja BC") hypothesis proposes large-magnitude northward translation of, at minimum, the Wrangellia terrane of the Insular belt relative to the North American craton during Late Cretaceous and Early Tertiary time. The hypothesis remains controversial (Mahoney et al., 2000; Enkin, 2006) as the paleomagnetic data upon which it is based (i.e., Bogue et al., 1995; Ague and Brandon, 1996; Irving et al., 1996; Ward et al., 1997; Housen and Beck, 1999; Enkin et al., 2001, 2003; Haskin et al., 2003; Housen et al., 2003; Bogue and Gromme, 2004; but see Stamatakos et al., 2001 and others) are methodologically sound yet seemingly contradicted by numerous geological and paleobiogeographical inferences (i.e., Mahoney et al., 1999; Butler et al., 2001a,b, 2006; Kodama and Ward, 2001; but see Miller et al., 2006).

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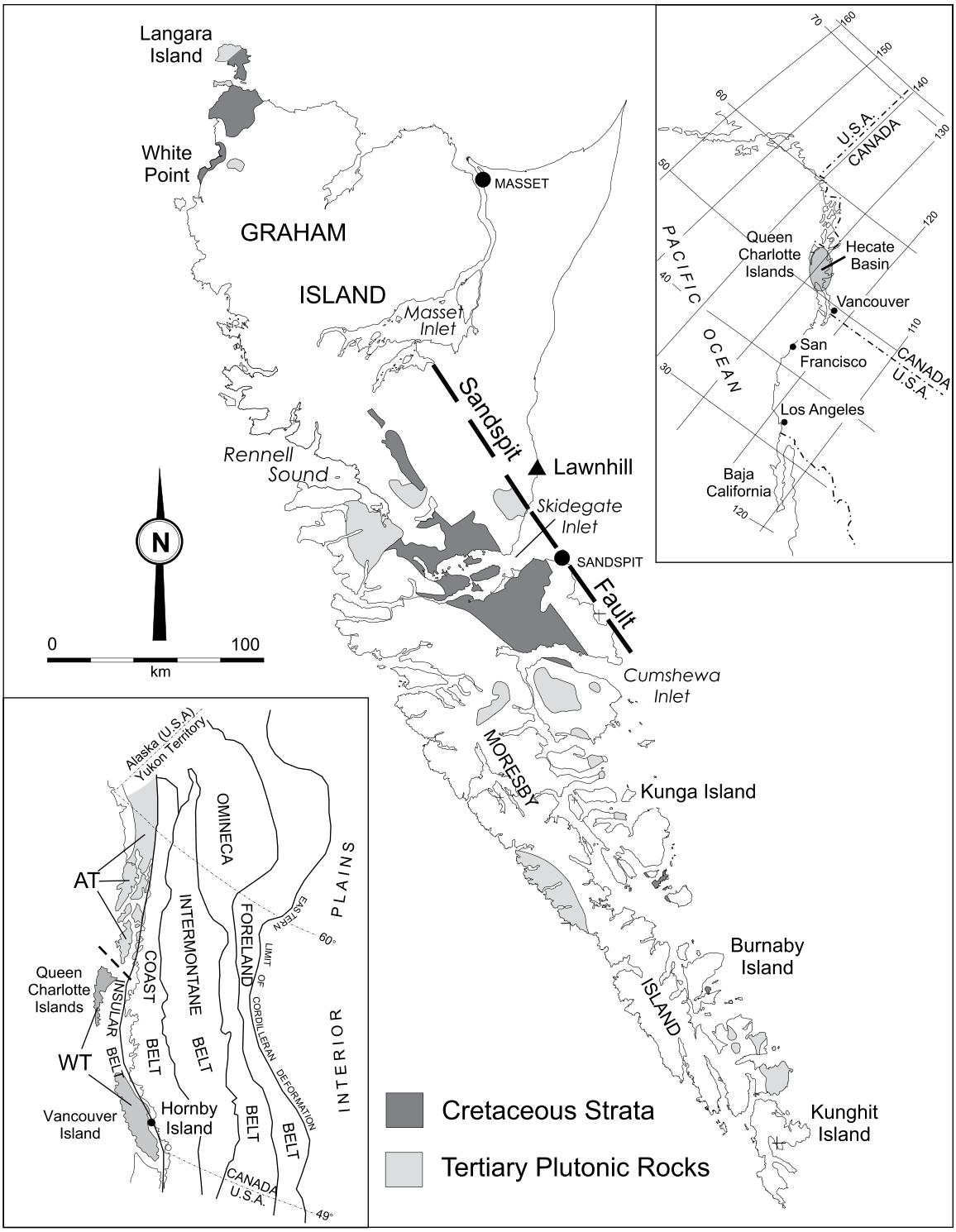

Fig. 1. Location map of Queen Charlotte Islands, British Columbia, showing location of Cretaceous (Campanian) outlier at Lawn Hill. Area of Cretaceous Hecate basin indicated in grey in inset. AT = Alexander terrane, WT = Wrangellia terrane. Note inferred paleo-high separating Cretaceous Hecate and Nanaimo basins of west coast Canada.

We present herein new paleontological and paleomagnetic data from Upper Cretaceous (Campanian to lowermost Maastrichtian?) strata of Queen Charlotte Islands. The faunal data establish for the first time the presence of upper Campanian strata on Queen Charlotte Islands, with correlatives exposed in southern Alaska and on Vancouver Island and associated islands of southwestern British Columbia, some 650 km south of Queen Charlotte Islands. In addition, while the paleomagnetic data are considered of insufficient quality and number to establish a paleolatitude suitable for paleogeographic analysis, recovery of reversed-polarity magnetization in calcareous concretions sampled in the section is considered most likely correlative with Chron 32r (ca. 71–73 Ma).

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