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Submarine glaciated landscapes of central and northern British Columbia, Canada

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Recent systematic multibeam sonar mapping and ground-truthing surveys in the fjords and coastal waters of central and northern British Columbia, Canada, provide information on glacial processes associated with the Cordilleran Ice Sheet, and also on postglacial processes that have strongly modified the glacial terrain. During the last glacial maximum, ice covered the Coast Range, except for nunataks. Convergent streamlined glacial landforms in the Strait of Georgia testify to a strong flow of ice towards the southeast, between Vancouver Island and the mainland. During ice retreat, thick deposits of acoustically stratified glaciomarine mud were deposited in glacially over deepened basins. Retreat through the Douglas Channel fjord system was punctuated by still stands, resulting in a series of submarine moraines. Postglacial processes have created a suite of landforms that mask the primary glacial terrain: 1) Fjord floors host thick deposits of acoustically transparent postglacial mud with highly variable distribution: banks up to 80-m thick are commonly adjacent to erosional zones with glaciomarine mud exposed at the seafloor; 2) In this region of high precipitation and snowpack melt, numerous cone-shaped Holocene fan deltas developed on the fjord sidewalls transport coarse sediment to the fjord floors. Larger deltas are developed at fjord heads, notably at Kitimat and Kildala; 3) Submarine slope failures in this tectonically active area have resulted in a suite of mass transport deposits on sidewalls and fjord floors. The very large submarine slope failures at Camano Sound and KitKat Inlet occurred on the steep, rear facets of large transverse moraines, and involved the failure of glaciomarine sediment that moved into deeper basins, perhaps as a retrogressive failure. The ages of these events are unknown, although the presence of postglacial mud in the slide scar at Caamano suggests that the event at that location occurred in the late glacial or early Holocene. Also, sub-bottom profiling shows that some mass transport deposits apparent on the multibeam imagery are not recent, and are blanketed by postglacial mud. Thus, submarine slope failure has been occurring throughout postglacial time; 4) Large, detached bedrock blocks on the fjord sidewall are currently being investigated with a view to understanding their rates of movement. They are provisionally interpreted as creep features, similar to terrestrial sackung.