



Subglacial landform patterns of the Cordilleran Ice Sheet: implications for ice dynamics and glacial history

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We present new glacial geomorphological mapping of 90% of the area covered by the Cordilleran Ice Sheet (CIS) in Canada. We used c. 80 Landsat TM scenes to map subglacial landforms (primarily glacial lineations and ribbed moraine). These landforms define the spatial flow organisation, and give insight into the subglacial thermal regime. In addition to the previously known and dominating Late Wisconsinan flow pattern, we discovered numerous fragments of older, overridden and partially destroyed lineation systems. These shed light on older, albeit undated, ice sheet configurations with more easterly ice divide locations than during the late Wisconsinan ice sheet configuration. In particular, the Pelly Mountains appear to have been an early outflow center, indicating a radically different ice sheet configuration in the northern part of the glaciated area. The subglacial preservation of relict lineation systems help define the subglacial temperature distribution of subsequent ice sheets, particularly the potential occurrence of frozen bed conditions. A strong topographical control on the CIS flow pattern was maintained everywhere. Striking features revealed by the new mapping are lenticular patches with few or no glacial lineations. These patches seem to have caused strong flow divergence, and we interpret them as sites of topographically-induced frozen bed conditions in an otherwise wet-based ice sheet sector.