Ice retreat patterns and chronology of the last Cordilleran ice sheet

Martin Margold[1], Arjen P. Stroeven[2], John Clague[3], Krister N. Jansson[2], Johan Kleman[2], Jakob Heyman[2]

(1) Department of Geography, Durham University, Lower Mountjoy South Road, Durham, DH1 3LE, United Kingdom, martin.margold@durham.ac.uk
(2) Bolin Centre for Climate Research, Department of Physical Geography and Quaternary Geology, Stockholm University, Stockholm SE-10691, Sweden
(3) Earth Sciences, Simon Fraser University, 8888 University Drive, Burnaby, BC V5A 1S6, Canada

Late Glacial ice dynamics of the Cordilleran Ice Sheet (CIS) are inferred using glacial landforms and Be-10 cosmogenic exposure dating. We reconstruct ice margin retreat patterns on a regional scale from ice flow and ice margin indicators such as glacial lineations and meltwater landforms, respectively. The eastern margin of the CIS on the Yukon Plateau and in the Liard Lowland, near the Yukon Territory – British Columbia border, and on the Interior Plateau of British Columbia retreated in a complex fashion towards an ice divide positioned over the Coast Mountains to the west. A shift of this ice divide, which in southern and central British Columbia at the local Last Glacial Maximum lay over the western portion of the Interior Plateau, occurred already before 15 ka. This timing is based on erratic boulder Be-10 exposure ages from the crest of the Marble Range in southern British Columbia. Meltwater channels at this location clearly show the ice divide to already have been to the west. Hence, an ice divide migration was in progress less than 2000 years after the local Last Glacial Maximum and the ice sheet thinning and reconfiguration in the interior of British Columbia occurred simultaneously with, or closely following, the demise of the western, shelf-based sector of the CIS. A set of erratic boulder Be-10 exposure ages from the summit area of the Hazelton Mountains in northern British Columbia indicates that a remnant ice cap persisted on the Skeena Mountains-central Coast Mountains into the Younger Dryas Chronozone. Ice-marginal meltwater channels at and near dated erratics at these two locations indicate rapid lowering of the ice sheet surface during deglaciation. The CIS was strongly out of balance with contemporary climate, both during the early stage of deglaciation documented in the Marble Range and later during melting of a spatially much reduced ice body on the Skeena Mountains-central Coast Mountains. Important future research tasks include further investigation of the chronology of ice retreat across the Interior Plateau, improved chronology and ice retreat pattern of the ice cap/CIS remnants in the Skeena Mountains-central Coast Mountains, and the response of the CIS to Late Glacial climate fluctuations.