Geophysical Research Abstracts
Vol. 18, EGU2016-9814-2, 2016
EGU General Assembly 2016

Comparing field-based and numerically modelled reconstructions of the last Cordilleran Ice Sheet deglaciation over the Thompson Plateau, southern interior British Columbia, Canada.

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Palaeoglaciological and palaeoclimate reconstructions of the deglaciation of the last Cordilleran Ice Sheet (CIS) over British Columbia (BC), Canada, are limited by the relative lack of understanding of the late-glacial ice sheet margins and dynamics. Deglaciation of the last CIS over the southern Interior Plateau of BC has been characterised as proceeding via stagnation and downwasting into dead ice lobes in valleys where ice was thickest. This conceptual model explains the apparent lack of moraines, which may otherwise imply active recession, and known palaeo-glacial lakes are explained as being dammed by these dead ice lobes. However, downwasting alone is at odds with coeval ice sheets which receded systematically towards their interiors.

Presented here is a comparison between a new field-based reconstruction of the deglaciation of the northern Thompson Plateau, and ice sheet model results of the same area. Glacioisostatic tilts, reconstructed using mapped shoreline elevations, rise to the north-northwest at around 1.8 m/km, implying an ice surface slope, and likely active recession, towards the Coast Mountains. New reconstructions of the stages of glacial Lake Nicola (gLN), utilising field and aerial photographic mapping of shorelines, and sedimentology and geophysical surveys on ice-marginal and glaciolacustrine landforms, largely support this interpretation; the lake expanded and lowered to the north-northwest as progressively lower outlets were opened during ice retreat in this direction. Fields of newly discovered glaciotectonised moraines, grounding-line deposits and overridden glacial lake sediments record ice margin oscillations and minor readvances within gLN; the general alignment of these features further supports recession to the north-northwest. Numerical simulations of deglaciation of the area results in ice retreat to the north-northeast, which is inconsistent with the north-north-westward evolution of gLN. Excess precipitation over the eastern CIS due to orographic effects not reconstructed in the model may account for the differences between the modelled and reconstructed patterns of deglaciation. Similarly, the influence of gLN on ice-margin dynamics, not included in the model, may explain the apparent discrepancies. However, numerical simulations broadly support the reconstructed style of marginal retreat over the Interior Plateau, postdicting a generally contiguous, systematically receding ice margin, with a significant ice surface slope and limited basal sliding. The Interior Plateau of BC is emerging as a key area to validate and refine numerical ice-sheet simulations, and to reconcile differences between model outputs and geomorphological evidence of CIS retreat.