



The retreat chronology of the western Laurentide Ice Sheet

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The peak of the Late Wisconsinan was the only time the two main North American ice sheets coalesced in the foothills of the Rocky and Mackenzie mountains of western Canada from near the Montana border to the Northwest Territories. Following the Last Glacial Maximum the western margin of the Laurentide Ice Sheet detached from the Cordilleran ice masses and a wedge of unglaciated terrain opened. Reconstructing the opening of the ice free corridor has been of great interest for archaeology and palaeoecology because it allowed for the migration of species between Beringia and the regions south of the ice sheets. However, the timing of the corridor opening is still ambiguous. Here we review the available ages that constrain the corridor opening and present new erratic boulder ^{10}Be exposure age datasets situated at the northern and southern ends of the corridor. The first dataset of 16 new ages stretches along the Rocky Mountain Foothills in Alberta between 49 and 53 °N, and the other covers the southern Franklin Mountains in Northwest Territories (14 ages at ~63 °N). The results indicate a detachment of the western margin of the Laurentide Ice Sheet from the Rocky Mountain Foothills in southern Alberta at about 15 ka. In the north, the Mackenzie River valley at 63 °N experienced a rapid drawdown of the ice sheet surface and a retreat of the ice sheet margin at about 14.5 ka, possibly in connection with the Bølling warming. The ^{10}Be ages indicate an almost simultaneous detachment of the western Laurentide margin from the Cordillera in the north and south. This contrasts with the existing ice margin chronology, based on ^{14}C data, which proposes that ice sheet separation in the Mackenzie River valley occurred at least 2000 years after separation in southern Alberta. In order to better constrain the final opening of the ice free corridor, more exposure ages are needed from northern Alberta, north-eastern British Columbia, and southern Northwest Territories.