

When was your last glacial maximum?

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The Last Glacial Maximum (LGM) at ~21.5 ka (18 ka radiocarbon years) was the time of maximum global terrestrial ice volume and hence lowest sea level during the last ~100 ka glacial cycle. A new compilation of ice-margin ages on the eastern Canadian continental margin shows that the timing of maximum ice extent varies geographically and that ice margins fluctuated over the period 40–15 ka. The maximum grounding line is identified from seismic reflection profiles and multibeam bathymetry. Glaciogenic debris flows and/or broad erosional channels are further evidence for shelf-crossing ice. Chronology is provided by seismic correlation into cores with radiocarbon dates and dated Heinrich (H) beds.

On the Scotian Slope, seaward of Western Bank, two maximum advances grounded to 540 m depth are dated at 24.5 ka and 28.1 ka. The maximum grounding line in the Laurentian Channel at 685 m is dated at 19.3 ka. On St Pierre Slope, two till tongues are dated 18.1 ka (540 m) and 33.9 ka (560 m). The Halibut Channel limit on the slope is undated, but in the channel at 150 m published work shows two till tongues overlie glaciomarine sediments dated at 17.8 ka and 22.5 ka, that disconformably overlie glaciomarine sediments partially remoulded during glacial advance probably correlative with the older St Pierre Slope till tongue. A ~45 ka shell date in the remoulded unit suggests an MIS 4 age for the basal till. Elsewhere around Newfoundland there is equivocal evidence for MIS 4 tills, more extensive than during the LGM. Northeast of Newfoundland, several ice advances are recorded seaward of Trinity Trough by well-dated glaciogenic debris flows (GDFs) at 28.5 ka, 27 ka (the largest and most prolonged), and then lesser advances at 24, 23, and 21 ka. Off Hawke Saddle, similar GDF deposition terminated at 25.5 ka. Farther north on the Labrador margin off Hopedale Saddle and Hudson Strait, GDFs correspond to H3 (30 ka), whereas off Nain Bank the shallowest GDF corresponds approximately to H2 (24 ka).

Thus the local last glacial maximum rarely corresponds to the classic 21.5 ka LGM. These observations on ice limits can be integrated with evidence for interstadial ice retreat on major ice streams such as those in the Laurentian Channel, Notre Dame Channel and Hudson Strait to demonstrate the dynamic variability and asynchronicity of ice growth and decay in eastern Canada.