

Note:

A more precise radiocarbon age for an 8 m post-glacial sea-level stand at Cow Head, Newfoundland

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Brookes and Stevens (1985) reported a conventional radiocarbon date of 8250 ± 320 BP ($\delta^{13}\text{C} = +1.0$ per mil; GSC - 3433 [2σ error]; Blake (1986), p. 5; normalized to 8634 ± 320 BP) on three paired valves of *Hiatella arctica* (Linné) occupying cavities bored by them in limestone breccia at 6 m asl, at Cow Head, Newfoundland, on the Gulf of St. Lawrence ($49^{\circ}55'\text{N}$; $57^{\circ}48'\text{W}$). Over the bored rock surface the beach-ridged surface of nearshore gravel relates to a sea-level stand at 8 m. This terrace is prominent locally, eroded across resistant Cambrian-Ordovician carbonates, as at Lower Head, which encloses Shallow Bay northward (Brookes and Stevens 1985, Fig.1). As mentioned in the original paper, two other shell occurrences in coastal cliffs along this shore have similar conventional ^{14}C dates, and are associated with emerged marine landforms with elevations falling on a plane rising gently northwards, from 6 m asl at Western Brook, 10 km south (8340 ± 150 BP, GSC 1763 [no $\delta^{13}\text{C}$ determined]), through the Cow Head - Lower Head features, to Parsons Pond, 13.5 km north (GSC - 1762, 8650 ± 150 BP [no $\delta^{13}\text{C}$ determined]). At the latter site, Grant (in Lowdon *et al.* 1977, p. 3) reported an emerged marine foreland terraced at 13 m, 8 m, and 5 m asl. A feature at closer to 11 m would be expected there in this projection.

A more precise AMS radiocarbon age has been obtained on a fragment of one *Hiatella* shell at 6 m asl on the same bored outcrop at Cow Head, 8960 ± 25 BP ($\delta^{13}\text{C} -1.4$ per mil) (UCIAMS - 44422 [normalized to 9382 ± 25]. After normalization and subtraction of an estimated marine reservoir age of 530 years, averaged from values given for northern and southwestern Gulf of St. Lawrence in Dyke *et al.* (2003), this age calibrates to $10\,599 \pm 35$ cal yr BP (Fairbanks *et al.* 2005).

Such a relative sea-level stand, which includes the geomorphic and taphonomic contexts at Cow Head, and the similar context at Western Brook, and possibly at Parsons Pond, over a coast-wise distance of 23.5 km, could be expected to apply more widely along this shore, although there is no sufficiently detailed survey. The sea-level stand may have been due to (i) regional climatic deterioration sufficient to cause significant increase in glacial loading, briefly slowing isostatic uplift to the same rate as ocean-level rise; (ii) briefly increased glacial melting on a regional or wider scale, causing ocean-level to rise

at the same rate as isostatic uplift; or (iii) briefly increased sea-ice activity which eroded the bedrock surface, destroying the *Hiatella* colony, and increasing the supply of inshore gravel to blanket the shore platform so formed.

The calibrated age of the shells at Cow Head, 10599 ± 35 cal yr BP, is at the upper end of the range of calendar ages determined for a climatic cooling in evidence at ten localities in and around the Gulf of St. Lawrence (Brookes and Grant, in press). Three of these contexts represent glacier stillstand or readvance - along the 700 km Quebec North Shore Moraine System (Dubois and Dionne 1985), and in small highland ice caps in the northern Long Range of Newfoundland (Waitt 1981), and in the Cape Breton Highlands (Grant 1994). The age limits of this cooling have yet to be determined, but its effects, nevertheless, would have been felt in increased sea-ice activity, possibly accelerating coastal erosion (iii, above). Considering the proximity of the retreating margin of the Laurentide Ice Sheet, retardation of isostatic uplift along this coast of the Goldthwait Sea by ice readvance or stillstand (i, above) is a possibility worthy of geophysical attention.

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