

Warmings in the far northwestern Pacific promoted pre-Clovis immigration to America during Heinrich event 1: Comment

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Sarnthein et al. (2006) suggest Late Pleistocene climatic forcing of New World peopling via Beringia, but pre-Clovis archaeological site dates remain debatable and American midcontinent dates can only be minima for colonization events. It is premature to assign pre-Clovis migration to a specific East Asian climatic episode.

Finding North American west coast migration probable, Sarnthein et al. (2006) call for studies of “potential human settlement locations along this route.” Uncited sources show that this has already been done in Alaska and British Columbia, where late pre-LGM (Last Glacial Maximum) and early post-LGM paleontological sites indicate viability of the Alexander Archipelago, Queen Charlotte Islands (Haida Gwaii), and Vancouver Island to support migrating humans (Ager, 1999; Fedje et al., 2004; Hetherington et al., 2003; Ward et al., 2003). Regional paleogeographic syntheses show effects of isostatic and eustatic changes on possible migration routes (Hetherington et al., 2004). By 12.5 ¹⁴C ka on Vancouver Island, and 13.0 ¹⁴C ka on Haida Gwaii, ungulates and large carnivores were present (Harington, 1996; Nagorsen and Keddie, 2000; Ramsey et al., 2004). The continental shelf between Haida Gwaii and the mainland was ice-free before 14.3 ¹⁴C ka, with pine woodland on Moresby Island by 13.0 ¹⁴C ka (Lacourse et al., 2005). Early post-LGM drowned forests are present on the floor of Hecate Strait and an artifact was dredged from the sea floor (Fedje and Josenhans, 2000; Josenhans et al., 1997). A pre-LGM deposit (18.0–16.0 ¹⁴C ka) at Port Eliza Cave, on the west coast of Vancouver Island, contains a diverse vertebrate fauna, including mountain goat, suggesting viability for human groups. Ice reached this coast after ca. 16.0 ¹⁴C ka and the LGM was brief, <3000 yr, a transient impediment to migrations (Al-Suwaidi et al., 2006).

Cordilleran ice advance, local LGM, and ice retreat were time-transgressive along the North American west coast: 16.0 ¹⁴C ka saw retreat in Alaska (Mann and Peteet, 1994; Manley and Kaufman, 2002) but advance on Vancouver Island. This is important because the Sarnthein et al. model could suggest that northwest coast glacial fluctuations paralleled Heinrich event 1 temperature changes. Differing chronologies from Alaska to southern British Columbia suggest a window of opportunity for southward human movement ca. 16.0 ¹⁴C ka as glaciers retreated in Alaska but were still advancing on Vancouver Island (Al-Suwaidi et al., 2006). This agrees broadly with the Heinrich 1 event model.

Nevertheless, human behavior cannot be modeled simply as ecologically forced. Humans respond to their perception of the *meanings* of environmental changes, and they are also entrepreneurial, so their worldwide spread suggests more than submissive responses to environmental changes. Ecological models have value but deterministic models do not.

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