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Climate's Role in Polar Bear Past [Letters]

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LETTERS

edited by Jennifer Sills

Climate's Role in Polar Bear Past

IN THEIR PROVOCATIVE ANALYSIS OF NORTHERN BEARS ("NUCLEAR genomic sequences reveal that polar bears are an old and distinct bear lineage," *Reports*, 20 April, p. 344), F. Hailer *et al.* use independent nuclear loci to show that polar bears originated during the middle Pleistocene, rather than during the late Pleistocene as previously

inferred from mitochondrial data. Although they discuss the possible role of climate warming in creating discord between nuclear and mitochondrial genetic signatures, the authors do not address climate's critical role in driving the evolution of polar bears in the first place. A reliance on perennial sea ice and a strongly pagophilic (i.e., ice-dependent) prey base,

including seals, suggests that polar bears could not have evolved in a world in which the Arctic Ocean remained unfrozen for large portions of the year, as it did most recently during the warm period of the middle Pliocene. Cooling of the Arctic Ocean commenced during the late Pliocene, driving a transition from predominantly seasonal to perennial sea ice that was largely complete by the middle Pleistocene about 700,000 years ago (1, 2). Striking temporal concordance between the new date for divergence of polar bears and persistent freezing of the Arctic Ocean suggests that this may be one of relatively few instances in which a specific paleoclimatological episode can be convincingly linked to a specific evolutionary event, and it provides vivid demonstration of climatic forcing as a determinant of diversification in biological systems.

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On ice. Polar bears' diet of ice-dependent prey provides clues to their past.