

Climatic Change in the Canadian Arctic: A 400 Million-year Perspective Based on Vertebrate Remains

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Abstract

This talk summarizes paleoenvironmental information derived from Arctic vertebrate faunas over the last 400 million years. The general trend is cooling from Late-Silurian-Early Devonian time (about 400 million years ago, e.g. fossil fishes in the Barrow Strait region indicative of tropical marine climate), through Middle to Late Cretaceous time (about 180 – 70 million years ago, e.g. mosasaurs, ichthyosaurs, plesiosaurs and birds in the Canadian Arctic Islands indicative of subtropical conditions), to Early Pliocene time [4 million years ago, e.g. the Beaver Pond site on Ellesmere Island where remains of plants (including beaver-cut sticks), freshwater shells, insects and vertebrates indicate average summer temperatures 10°C warmer than present and winter temperatures 15°C warmer]. The Mammoth Fauna of the Yukon Late Pleistocene (20,000 years ago) existed in cool, dry steppe conditions. During Late Pleistocene-Holocene time (11,000 years ago to present), hundreds of radiocarbon dated marine mammal (especially bowhead whale and walrus) remains from raised beaches throughout the Canadian Arctic Islands indicate relatively warm phases exemplified by large populations throughout the islands from 10,000 to 8500 years ago and from 5000 to 3000 years ago. During colder phases from 8500 to 5000 years ago, and 3000 years ago to the present, the channels between the islands failed to clear of sea ice. This kind of information helps to put the modern concept of “global warming” in perspective.