

**THE CAPE ROBERTS PROJECT: TECTONIC AND CLIMATIC HISTORY OF THE VICTORIA LAND COAST, ANTARCTICA, FROM 34 TO 17 MILLION YEARS AGO.**

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From 1997 to 1999 the Cape Roberts Project drilled 3 holes 13 to 16 km off the Victoria Land coast at 77.0°S and 163.7°E. The project was a cooperative venture between scientists, administrators and Antarctic support personnel from 7 countries. The aim was to investigate the early history of the East Antarctic ice sheet and the West Antarctic Rift System. The cores are a nearshore marine sedimentary record ~1500 m thick, well-dated from volcanic ash, biostratigraphy, Sr isotopes and magnetostratigraphy.

Key findings are:

- i) Provenance studies indicate the Transantarctic Mountains had achieved most of their present height by 34 Ma. While apatite fission track studies show Cenozoic denudation began at ~55 Ma, CRP core studies show that most of the 1500 m of subsidence on the western margin of the adjacent Victoria Land Basin took place from 34 to 29 Ma, slowing down to almost none by 17 Ma, and none since that time. This differs from the established history of the West Antarctic Rift System.
- ii) The stratigraphy is largely cyclic repetitions of shallow glacial marine facies, with well-dated cycles of glacial advance and retreat around 24 Ma showing that the Antarctic ice sheet responded to orbital forcing, causing major changes in sea level.
- iii) Pollen records show that the Victoria Land coast cooled from a temperate climate (>34 Ma) through a cool temperate climate (34 to ~17 Ma), with no hint of the late Oligocene warming inferred from deep-sea isotopes. This trend is seen in sediment features and clay mineralogy.
- iv) A 2-m-thick shell bed within 43 m of Quaternary strata in CRP-1, and dated at 1.1 Ma, records a "super-interglacial" period (MIS 31) when the Antarctic coast was ice-free and significantly warmer than today.

Detailed results can be found in 10 issues of the journal *Terra Antarctica* between 1998 and 2001, and papers listed at [www.vuw.ac.nz/croberts](http://www.vuw.ac.nz/croberts).