



2014 SCAR OPEN SCIENCE CONFERENCE

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COMNAP Symposium Success through International Cooperation

ABSTRACTS

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Southern Ocean endemism evident in Late Eocene radiolarian assemblages, DSDP Site 277, Campbell Plateau (New Zealand)

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This project investigates the effect of extreme global warming on fossil radiolarian distribution in the Eocene (54-34 Ma ago), and aims to further advance the tools for Paleogene climate reconstruction and identifying the oceanographic changes that occurred prior to, and during, the build up of the first Antarctic Ice Sheets. The advantage of radiolarians is their greater overall diversity and abundance in high latitudes compared to calcareous plankton. Initial research is focussed on changes in radiolarian assemblages through the Middle Eocene Climatic Optimum (MECO) and post-MECO cooling interval (42-32 Ma) because this is an interval in which radiolarians are well represented in Southwest Pacific sediments, and documents the end of the Eocene greenhouse climate state.

The study is based on sediment cores from the high-latitude southwest Pacific (DSDP Site 277, Campbell Plateau) and Lord Howe Rise (DSDP Leg 21) and sedimentary sections onshore New Zealand (Marlborough). Radiolarian census studies of these records are used to reconstruct the southern extent of tropical water masses during the MECO. Interpretation of variation and trends in radiolarian assemblages entails a thorough review of Eocene radiolarian taxonomy and distribution with reference to key sites in lower latitudes and the Northern Hemisphere, such as the equatorial eastern Pacific (IODP Leg 320), the West Atlantic (ODP Leg 207, Demerara Rise), and the North Atlantic (IODP Leg 342).

Initial results for DSDP Site 277 show that the Middle Eocene radiolarian assemblages lack warm-water species and so the site was not influenced by subtropical currents during this time. However, we have not confirmed the presence of the MECO at this site. Radiolarian turnover accelerated in the early Late Eocene and peaked in the latest Eocene. Turnover was linked to the progressive expansion of Antarctic taxa, indicating that Southern Ocean cooling began prior to the E/O boundary.