



Eccentricity-Paced Southern Hemisphere Glacial-Interglacial Cyclicality Preceding the Middle Miocene Climatic Transition

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We present new environmental magnetic data from the Southwest Pacific spanning the middle Miocene climatic transition (circa 16.2–13.5 Ma), which indicate a dynamic South Pacific Oceanic system with two periods of increasing and decreasing current strength in response to orbitally paced ice volume variations. A magneto-biostratigraphic age model provides age control for magnetic susceptibility and Anisotropy of magnetic susceptibility data from a mudstone succession in Western Southland, New Zealand. Magnetic susceptibility in this succession reflects changes in carbonate content, which we suggest is proxy for ocean productivity or sea level variations and therefore a proxy for ice volume changes. Timeseries analyses of the magnetic susceptibility record reveals eccentricity and obliquity paced ocean productivity cycles. Anisotropy of magnetic susceptibility data carry a record of deep current strength in response to ice volume changes. Our data show that periods of increased ice volume resulted in the northward migration of erosive currents in this sector of the Pacific and that large, dynamic ice sheets may have persisted in Antarctic during the middle Miocene climatic optimum.