

A Rock-Magnetic and Geomagnetic Secular Variation Record from Late-Pleistocene Lake Estancia, New Mexico

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Abstract

Exposed sediments of Late Pleistocene Lake Estancia contain a high resolution record of regional climate variability for the period about 12,000 to 32,000 years. A detailed rock-magnetic study is being performed on this well-dated, well-preserved sedimentary sequence to determine how the magnetic signature of sediments responded to regional climate change. A record of short-term geomagnetic field changes (secular variation) is also being constructed for use in correlating the climate record from Estancia with those from the west coast of North America and the Pacific Ocean. Samples were taken from the lake sequence exposed in two Holocene blowouts, near the lake basin center. Using lexan cubes, a sampling interval of 1.9 centimeters was established to obtain a record with a temporal resolution on the scale of decades. A long (7.7 meter) sedimentary sequence was sampled from one locality and DRM, ARM, and IRM data have been collected on this large suite. A shorter (3 meter) sequence is currently being sampled and analyzed. The relationship between X_{vol} and Depth in the sequence is useful for intrabasinal correlation. Along with X_{vol} , the variation in magnetic mineralogy, grain size, and grain abundance may indicate when and how quickly regional climate changes occurred. Rock-magnetic parameters indicate that the dominant magnetic carrier in these sediments is pseudo-single domain magnetic, though the magnetic mineral abundance is variable throughout the sequence. Thermal studies are underway to determine the role of Fe-sulfides as remanence carriers and lake environment indicators.