Geophysical Research Abstracts
Vol. 15, EGU2013-12313, 2013
EGU General Assembly 2013

Characterizing Lacustrine Sediment that Records the Matuyama/Brunhes Polarity Transition at Bishop, California

Joseph Liddicoat (1), Jennifer Bergeron (1), Brian Mailloux (1), and Timothy Kenna (2)

(1) Barnard College, Columbia University, NY, NY 10027 USA, (2) Lamont-Doherty Earth Observatory, Columbia University, NY, NY 10027 USA

We are doing a study of the physical and chemical properties of exposed lacustrine sediment deposited in Pleistocene Owens Lake near Bishop, CA (37.3˚ N, 241.5˚ E) that was used in an investigation of the Matuyama/Brunhes (M/B) polarity transition (Liddicoat, 1993). The study complements one of similar lacustrine sediment that records the Mono Lake Excursion in the Mono Basin, CA (38.0˚ N, 240.8˚ E) where field strength (Coe and Liddicoat, 1994) and percentage of inorganic carbon seem to be contributing factors on the ability of magnetic grains to accurately record field direction when the field is changing rapidly. For instance, there is an inverse relationship between the percentage of total inorganic carbon (TIC) and the mobility of magnetic grains that preserve the remanence – the greater the percentage of TIC, the less likely grains become realigned when the field directions change (Spokowski et al., 2011). At Bishop, as in the Mono Basin, the sediment is unweathered fine- to medium-grain sand, silt, and volcanic ash from a nearby granitic (Sierra Nevada) and volcanic provenance (Lajoie, 1968), and the dominant magnetic mineral is magnetite (Liddicoat and Coe, 1979; Liddicoat, 1993). The Bishop Ash, dated by K/Ar at about 0.68 m.y. (Dalrymple et al., 1965), is in conformable contact with the lake sediments, which are exposed in the former bank of the Owens River.

At Bishop we are using samples that record reverse (Matuyama), transitional, and normal (Brunhes) polarity that were demagnetized in an alternating field. The percentage of grains with a diameter less than 63 micrometers is about 40 percent in the reversely magnetized sediment and about 65 percent in the sediment that records transitional or normal polarity. These percentages differ somewhat from those in the Mono Basin where the percentage is about 80. The percentage of total organic carbon (TOC) does not exceed about 3 percent in the Owens Lake sediment and it is slightly less in the Mono Basin sediment (Spokowski et al., 2011). Grains with a diameter less than two micrometers constitute 2-4 percent of the Mono Basin samples; that grain size and the TIC are being determined for the Owens Lake sediment and will be presented.

On the basis of the data we have so far, the percentage of sediment grains less than 63 micrometers does not seem to be a controlling factor. Excellent grouping of usually six samples for each measured horizon is small (less than 5 degrees) in stable normal and reverse polarity at each end of the M/B transition even though the percentage of grains less than 63 micrometers differs by a factor of almost one third.