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A reconnaissance rock-magnetic and paleomagnetic survey on a 27 m long lacustrine core from Lake Chapala (western Trans-mexican Volcanic Belt. (CHAPHOLO Project, Conacyt grant 168685).

Gogichaishvili A.[2], Zárate-del Valle P.F.[1], Pérez Izazaga E.[2], Morales J.[2]

[1]University of Guadalajara-Chemistry Department. Guadalajara. 44430 Mexico. zavp.pvaz@gmail.com
[2]Laboratorio Interinstitucional de Magnetismo Natural, UNAM, Campus Morelia. 58190 Mexico.

The magnetic properties of lake sediments may act as sensitive proxies of environmental and paleoclimatic information. On the other hand, the systematic measurements of oriented long cores may provide invaluable information about the secular variation of the Earth's Magnetic Field through the study of magnetic inclination and relative paleointensity.

We report a detailed rock-magnetic investigation from Lake Chapala (western Trans-Mexican Volcanic Belt) sedimentary core in order to identify the possible links between magnetic parameters and ambient climatic and environmental processes during the last 10,000 years Before Present. The full set of magnetic measurements included: measurements of bulk magnetic susceptibility at low and high frequencies (Fig. 1), b) natural remanent magnetization, c) laboratory induced isothermal and anhysteretic remanences and d) hysteresis cycles. Additionally, the temperature dependence up to 700 °C of magnetic susceptibility was determined in air for selected samples. Rock magnetic parameters exhibit different behavior depending on layer involved. Several layers of relatively high magnetic susceptibility reflect the presence of volcanic ashes. These samples are characterized by the presence of two phases in the heating curve: Titanium poor titanomagnetite (Curie temperature of about 565 °C) and another lower temperature phase, probably (titano)maghemite, which transforms into almost pure magnetite.

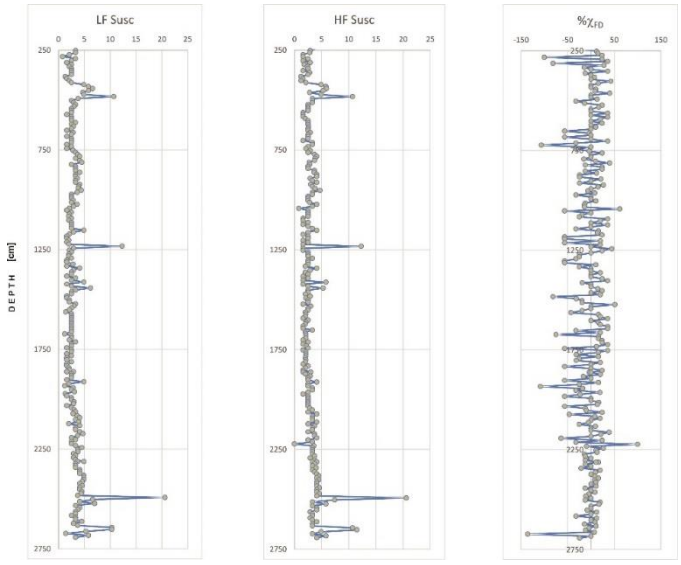

Figure 1: Low Frequency Susceptibility (LF Susc), High Frequency Susceptibility (HF Susc) and Susceptibility depending on Frequency (%χ_{FD}).

Other magnetic parameters, such as bulk magnetic susceptibility (χ), saturation remanence magnetization (M_{rs}) and saturation magnetization (M_s) show similar variations with depth. This attests

that main magnetic carriers are pseudo-single-domain ferromagnetic grains. Furthermore, relatively low frequency dependent susceptibility values, lower than 4.5 %, are found through the whole profile. These values indicate a minor contribution of superparamagnetic (SP) ferrimagnetic minerals along the entire profile.

In regard to directional and intensity determinations of natural remanent magnetization (NRM), magnetic inclination presents smooth variations, mostly below its actual value (~ 47 °), at the first 10 m in depth. On the contrary, a decrease of the strength of the NRM is observed, which inversely correlates with variations in the inclination.