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Paleomagnetic and structural evidences for Early Oligocene transtensional deformation in Central Mexico

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Paleomagnetic results for Early Oligocene volcanic units of the Mesa Central (Mexico) are used to investigate the tectonic activity along the San Luis-Tepehuanes fault system (SLTFS). The SLTFS is a major structural feature constituted by a well-defined group of parallel faults that strike N130˚ and dip southwest. The main activity of the SLTFS was coeval with the ignimbritic pulse that affected the Mesa Central during Late Eocene and Early Oligocene. Structural data that we collected in San Luis Potosi, Guanajuato and San Luis de la Paz areas argue for a left-lateral transtensive motion along the SLTFS. The mean direction of extension is oriented SSW. Characteristic magnetization directions were obtained for 64 sites in San Luis Potosi and Guanajuato areas. A total of 500 samples have been demagnetized using mostly alternating field demagnetizing methods, supplemented by thermal analyses. Bedding correction using AMS data was applied to 49 sites. The computed virtual paleomagnetic poles for the San Luis Potosi area (155.2˚E, 69.2˚N, a95= 8.6˚, N= 25) and for the Guanajuato area (168.6˚E, 73.8˚N, a95= 6.0˚, N= 17) were compared to the 30Ma paleomagnetic pole for stable North America. Our data indicate counterclockwise rotations of $\sim$10˚. These results may be interpreted in terms of vertical-axis rotations associated with regional left-lateral shear in a normal/strike-slip fault environment, which has characterized the SLTFS during the Early Oligocene.