

DEEP FAULTING IN THE WESTERN SEGMENT OF THE ASUNCIÓN RIFT, EASTERN PARAGUAY: STRUCTURAL, GEOPHYSICAL AND PETROLOGICAL EVIDENCES

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The Eocene magmatism of the western segment of the Asunción Rift (Asunción Alkaline Province) was controlled by deep NW-SE-trending faults with magnetic and gravimetric expressions that served as conduits for the ultra-alkaline magma, coming from more than 60 km depth and bearing mantle xenoliths to the surface. Petrologic data suggest that a short interval of time elapsed between the ascension of the nephelinitic magma and their emplacement at shallow crustal levels. The similarity in composition of the zeolite filling in vesicles and fractures of the nephelinites seem to indicate that joints were developed immediately after the solidification of the igneous bodies, but still under the action of Na-rich residual solutions. Cooling and fracturing in relatively restricted areas make evident that the NW-SE-trending structural alignments represent progressive crustal extension generating deep faults, with great energy loss in the asthenosphere, leading to further melting of the lithospheric mantle by decompression during a relatively short time interval. The study of families of fractures associated with intrusion in the Benjamin Aceval, Confuso, Lambaré and Ñemby ultra-alkaline bodies showed a distribution pattern configuring a fracture spectrum, as due to the action of a stress regime with s_1 horizontal, in the NW-SE direction, s_3 horizontal, in the NE-SW direction, and s_2 vertical, all of them compatible with the action of a right-lateral strike-slip shear couple orientated E-W. The validity of this regime during the Eocene is corroborated by the NW-SE orientation of the nephelinitic dykes, such as Cerro Cõi, Cerro Choröri and Cerro Piquete Cué.