

THIN CRUST AND HIGH HEAT FLOW
IN THE TRES MARÍAS FRAGMENT, WESTERN MEXICO:
A VIABLE TARGET FOR ULTRA-DEEP DRILLING?

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POSTER ABSTRACT

The transition of Baja California from the North America plate to the Pacific plate began in the Late Miocene. Extensional processes of the crust occurred along with the translation of the peninsula, which most probably persist to the Present. The thinning of the crust is now well documented by means of SE trending seismological profiles between the tip of the peninsula and the Jalisco block in mainland Mexico. Extension in the NW direction is manifested as a thinned crust. From the Jalisco block to the mid of the Gulf's mouth the crust goes from continental to oceanic; however, there are discrepancies regarding where the continent-ocean transition occurs along this region. The terminus of the Middle America Trench is usually located at the base of the Tres Mariás Escarpment; from there to the coast of Nayarit, in an E-W direction, there is a region to be called Tres Mariás Fragment, consisting of a shallow sea (depth < 500m) containing Pleistocene and Pliocene sediments underlain by oceanic crust which, advancing landwards (E), transforms into transitional crust and then into continental crust. There are various volcanic formations in the area; in particular the only island east of Islas Tres Mariás is Isabela, consisting of a series of explosion craters (Maars). The seismological results indicate the Tres Mariás Fragment having a crustal thickness of ~15 km. High temperature gradients have been reported in the area ranging from 259 °C/km west of Islas Tres Mariás to 40 °C/km close to the coastal area. In particular, a well reaching 3157 m below sea level yielded a gradient of 73 °C/km within 10 km of Isabela island. Acoustic and magnetic basements are irregular in shape but range between depths of 1000 to 3000 m. These high temperature gradients obtained in the area suggests the existence of a shallow brittle-ductile transition, probably taking place between 7-10 km depth. The above characteristics of this area suggest it may constitute a suitable target for ultra-deep drilling.