

# **MAGNETIC CHARACTERISTICS OF FRACTURE ZONES IN YOUNG VOLCANIC TERRAINS**

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Detailed magnetic anomaly surveys over the central and southern sector of the Colima rift, western Mexico are used to investigate the subsurface structure and faults/fractures in the volcanic terrains formed by activity in the Colima volcanic complex (CVC). The CVC is located within the large north-south Colima rift in western Mexico. The Colima rift is a major active tectonic structure, trending perpendicular to the Middle America trench and related to subduction of the Rivera and Cocos plates. Volcanic activity in the CVC has migrated southward towards the trench. Analyses of faults and recent deformation in the CVC and Colima rift are of major interest in volcano tectonic studies and for hazard assessment. Structural analyses and fault mapping are however difficult as young volcanic and pyroclastic rocks obscure structural features and stratigraphy. Most of the southern Colima rift is covered by volcanic avalanches and volcanoclastic units, which have resulted in re-surfacing of the volcanic terrains. Here we show that magnetic anomalies permit identification of faults in the volcanic terrain and mapping of volcano-sedimentary and volcanic units. Total magnetic field measurements spaced every 0.5 km along 8 profiles, with an overall length of 284.5 km and covering the CVC sector of the Colima rift, have been obtained. We recognize fractures and fault zones of local and regional character from their characteristic magnetic anomaly response. Large mapped structures include N-S Montitlan, NE-SW La Lumbre, and E-W La Escondida faults, which can be traced across the area from the magnetic profiles. Fault magnetic anomalies are modelled by lateral contrasts in terms of step models assuming thin dipping elongated zones along the fault planes. The study shows that faults/fractures in young volcanic terrains can be investigated by magnetic surveying.

magnetics, faults, volcanics

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