Assessment of Volcanic Risk in the Trans-Mexican Volcanic Belt, Mexico

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The Trans-Mexican Volcanic Belt (TMVB) extends 1200 km across southern Mexico, from the Pacific Ocean to the Gulf of Mexico. Volcanic activity is associated with oblique subduction along the Middle America Trench, and began in the Miocene. Volcanism is characterized by bi-modal composition extrusions, forming stratovolcanoes, maars, and cinder cone fields. Two volcanoes are currently active: Colima in the western TMVB, and Popocatepetl near Mexico City.

In order to evaluate the potential risk of other volcanoes, a study is being conducted to survey the major volcanoes and volcanic fields in the TMVB. We are using a combination of field work, C-14 dating, literature review, and analysis of remote sensing images to determine the eruptive history of dozens of structures. Preliminary results have revealed that several volcanoes, once thought to be extinct, are in fact active, having erupted in the last 10,000 years. These include Jocotitlan, where lava flows that bury Pre-Columbian settlements have yielded ages between 890 and 680 y.B.P.; La Malinche volcano outside Puebla, where pyroclastic flows have been dated at 3100 y.B.P.; and Nevado de Toluca volcano, where deposits have been dated at 3,300 y.B.P.

Perhaps the most dangerous volcano is Popocatepetl, 60 km SE of Mexico City, where 20+ million people could be affected by a major eruption. Based on our extensive work at Popo, we discovered that catastrophic Plinian eruptions occurred 1200, and 2500 y.B.P., accompanied by extensive lahars that buried agricultural fields, towns, and ceremonial centers. A similar eruption cannot be ruled out in the future.

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