Prefered session: IV Stability and instability of volocanic edifices

ORAL

Debris avalanche deposits at Popocatepetl and Iztaccihuatl volcanoes, central Mexico

Claus Siebe and Jose Luis Macias (Instituto de Geofisica, UNAM, Ciudad Universitaria, Coyoacan, C.P. 04510 Mexico D.F., Mexico, Tel. 52-55-5622-4146; FAX. 52-55-5550-2486, e-mail: csiebe@tonatiuh.igeofcu.unam.mx
Michael Abrams (Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, CA 91109)

Cone collapse and the subsequent emplacement of debris avalanche deposits represent an infrequent but large hazard posed by strato-volcanoes to nearby populations.
Detailed geologic mapping 70 km SE of Mexico City of presently active Popocatepetl (5452 m) located directly to the south of older Iztaccihuatl (5285 m) volcano revealed that cone collapse has occurred on several occasions at these paired volcanoes during the Late Quaternary. Popocatepetl collapsed on three occasions toward the south and Iztaccihuatl once toward the east producing extensive deposits with typical hummocky topography.
Outcrops at proximal and distal areas from Popocatepetl show three superimposed debris avalanche deposits separated by volcaniclastic deposits and well developed paleosols. All three deposits are similar in extent, lithology, internal structure, etc., and form an extensive fan that reaches more than 70 km to the south from the crater and occupies an area of 600 km2. The emplacement of the youngest debris avalanche deposit with a volume of 9 km3 was triggered by a plinian eruption dated by the radiocarbon method at 22-23,000 years B.P.
The smallest and probably oldest debris avalanche deposit originated from Iztaccihuatl and reached ca. 50 km to the east, where it forms the substrate of large portions of the Puebla Valley to the west of the Atoyac river.
Because of the buttressing effect of Iztaccihuatl volcano to the north, it seems most probable that presently active Popocatepetl will collapse again to the south in the geologic future. For this reason careful geodetic monitoring of Popocatepetl's southern slope is more important than monitoring of the northern slope, which is of easier access by vehicle.