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MULTIPLE EXPLOS1ON CRATERS AT CERRO XALAPAXCO, AN UNUSUAL TUFF CONE IN EAST - CENTRAL MEXICO (STATE OF PUEBLA)

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Xalapaxco tuff cone near the base of the northeast flank of La Malinche stratovolcano in central Mexico, has an unusually large number (1 O) of explosion craters, which are concentrated on the central and on the uphill side of the cone. The craters expose alternating beds of stratified surge deposits and massive fall deposits indicating the involvement of significant quantities of groundwater during eruption. The phreatomagmatic eruptions which led to the. cone's formation pierced an alluvial fan, whose source is a glacially carved canyon near the summit of La Malinche volcano. The large canyon was cut during repeated glacial episodes, the last of which ended ca. 8,500 years ago. The present alluvial fan mostly consists of reworked glacio-fluviatile andesite/dacite material from La Malinche. Rising magma encountered substantial amounts of groundwater within the limestone basement and in overlying intercalated pyroclastic and glacio-fluviatile deposits of the alluvial fan. Short-1ived phreatomagmatic eruptions produced surge and airfall deposits. Xenoliths found in the cone beds are composed of dacite and andesite clasts, limestone, chert, and rare ignimbrite fragments, No juvenile material could be unequivocally identified, but is represented most probably by porphyritic dacite similar in texture and composition to La Malinche lavas. The multiple craters were formed as a response to changes in water and magma supply during the short-lived eruption. Hence the locations where ideal magma/water ratios existed to fuel phreatomagmatic explosions shifted in time and space. Analysis of diameter/depth ratios of the craters indicates that the activity shifted from the center of the cone to its periphery in the west. Duc to the configuration of the hydrographic environment, more groundwater flowing from La Malinche was available from the fan on the uphill side than below the cone at later stages of the eruption. The apparently anomalous position of the tuff cone on the slopes of a stratovolcano in a presently dry environment can be explained by more humid climatic conditions prevailing at the time of eruption.