The AD 536 Phreatoplinian eruption of Volcán Ilopango, El Salvador: physical character of ash-rich pyroclastic-density-current deposits and coeval ash aggregates

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In AD 536 Volcán Ilopango erupted violently through a substantial caldera lake and changed Central American prehistory through the destruction of the Miraflores culture. About 2.5 million people now inhabit El Salvador's capital, San Salvador, less than 12 km from the caldera. The complex eruption sequence (informally named Tierra Blanca Joven) includes (1) a vent-clearing fall, (2) a short-lived Plinian fall, (3) a complex sequence of phreatomagmatic pyroclastic density currents and coeval ash fall, (4) an alternating sequence of ash falls (commonly wet) and pumice lapilli falls, and (5) a climactic ignimbrite. Total bulk-deposit volume exceeds 50 km3. Pyroclastic density currents generated by the eruption travelled more than 20 km from the caldera and left ash-rich ignimbrites that cumulatively reach 50 m thick within some valleys but thin over ridges to thicknesses of a few meters. Flow deposits include ash-rich, lithic-poor, massive to planar-bedded and cross-stratified ignimbrites. Within 5 to 10 km of the caldera, ignimbrite units are composed of fine- to coarse-grained ash and contain abundant matrix-supported accretionary lapilli and accretionary-lapilli fragments separated by planar to wavy erosive scours. At distances of 10 to 15 km, clast-supported ash pellet layers, interpreted as fall deposits, either from the co-ignimbrite plume or from a spreading umbrella cloud, separate fine-ash-rich ignimbrite units. Confinement of the accretionary lapilli to pyroclastic flow units is evidence in support of their formation within pyroclastic density currents. Fallout of millimetre- and centimetre-sized ash aggregates formed metre-thick massive ash deposits in medial to distal areas during the latter stages of the eruption.