



The Donguinyo-Huichapan caldera duplex. Two superimposed contrasting calderas of the Mexican Volcanic Belt

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The Donguinyo-Huichapan caldera complex (DHCC), located 110 km to the NNW of Mexico City, is a 10 km in diameter summit structure, with a rectangular horse-shoe shape opened to the SW. It is a two-superimposed caldera complex, each caldera related to a large ignimbrite sequence, the 5.0 \pm 0.3 Ma Donguinyo tuff and the 4.2 \pm 0.2 Ma Huichapan tuff. The first sequence consists of a series of thin, low aspect ratio (mostly 0.5-2 m thick), high-grade, dark brown, andesitic-trachydacitic ignimbrites, with evidence of magma mingling, that crop out to the north and north-east of its source, the Donguinyo caldera. The rim of this caldera was formed at about 4.6 \pm 0.3 Ma by several shield volcanoes and small cinder cones that erupted, low-aspect ratio, mafic lava flows. The magma of the rim stage did not have the sufficient viscosity to form the typical rim lava domes. At 4.2 \pm 0.2 Ma, the Huichapan caldera was formed during eruption of the voluminous Huichapan tuff. This time, the products were rhyolitic, and included surge, pyroclastic flow, and pumice fallout eruptions, culminating with the emplacement of one of the major ignimbrites in the central Mexican Volcanic Belt, the Huichapan ignimbrite, which reached as far as 60 km to the east of its source, and blanketed the whole area around the caldera, except for the N and NE directions. Also at 4.2 \pm 0.2 Ma, several dacitic, porphyritic, lava domes were extruded along the ring fracture and formed the Huichapan caldera rim. Then, five intra-caldera domes of dacitic-rhyolitic composition were extruded, the largest of which, Cerro Hualtepec, was dated at 4.2 \pm 0.3. The eastern flank of the caldera complex was buried by the Nopala shield volcano and by the mafic lavas derived from it dated at 2.5 \pm 0.1 Ma. This volcano is part of the Jilotepec-Nopala volcanic field, a cinder cones and shields field that covered most of the southern deposits of the DHCC.