

The volcano Cuicocha, Ecuador: Recent post-volcanic activities and lake formation

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The Cuicocha is a young volcano at the south flank of the Cotacachi, a pleistocene inactive volcano. The Cotacachi is part of the large tectonical complex, located close to the Sutura Calacali-Pallatanga. The strato-volcano Cotacachi mainly consists of massive layers of pyroxen bearing andesitic lava flows. The morphology of the volcano is strongly influenced by glacial and post glacial erosion processes. About 3000 years ago the volcano Cuicocha was created by a large explosion and during the following period of volcanic activities, a large caldera (3 km of diameter) and four domos in the caldera were formed.

Investigations of mineralogical composition showed different types of lava flows and pyroclastic material, in the eastern part of the domo a large block of cretaceous basement material was lifted up and nowadays forms part of the crater rim. Carbon-14 investigations of different subsoils from the islands indicate an age of only about one thousand years, paleosoils are also determined. Detailed bathymetry of the caldera lake is given and shows two different lake areas of 140 m and 75 m depth with four domos. Recent volcanic activities like CO₂ emission and hydrothermal waters occur in the lower lake basin and the north-western flank of the island Yerovi.

Geochemical and mineralogical investigations of 18 different types of rocks from the lake catchment area only show little variation in composition. Water chemistry of the caldera lake is mainly influenced by the input of weathered volcanic material of Cotacachi and Cuicocha. Lake sediments are mainly formed by fine grained clastic volcanic material and amorphous components like allophanes from soil weathering. Production of organic material and of carbonates only play a minor role in sedimentation processes. Undisturbed water and sediment sampling was guaranteed by using especially developed autoclave sampling devices, furthermore an underwater camera and sonar were applied.