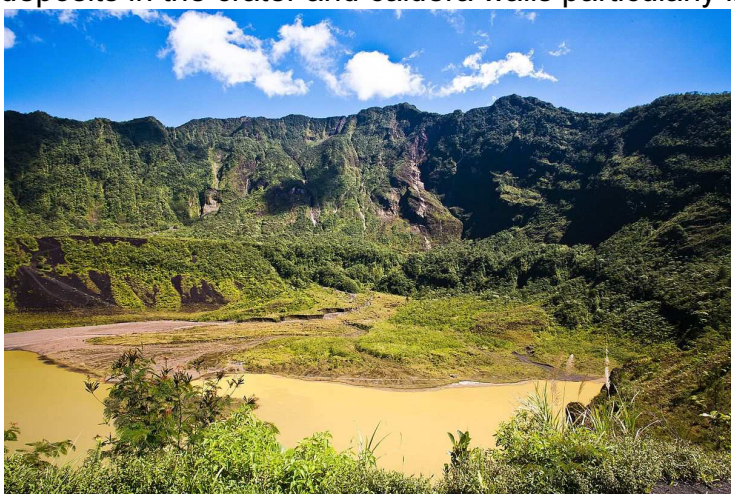
VOLCANIC GEOLOGY OF MOUNT GALUNGGUNG

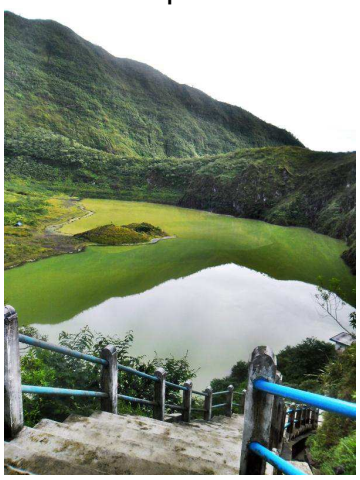
Old Galunggung volcanic rocks consist of lava flows, pyroclastic deposits, dike, a cryptodome and lahar deposits. Stratigraphy of Old Galunggung volcanic rocks can be observed clearly in the walls of Old Galunggung crater and Galunggung caldera after the 1982-83 eruption.

The oldest lava flow is exposed in the deepest southwest caldera wall. A lava flow in the summit crater rim is considered the youngest lava extruded by Old Galunggung volcano. Volcanic deposits in the crater and caldera walls particularly in the lower parts are hydrothermally altered.



Now you can take 620 steps to the edge of the crater for views into the caldera.

Then... if it's safe you may be allowed (with a guide?) to take the steps down into the crater!



The geologic history of Galunggung began with a constructive period of Old Galunggung stratovolcano. The earliest eruptions ejected mostly pyroclastic deposits which alternate with lava flows in the following stages. The eruptions occurred in the Old Galunggung crater. Reworked material formed lahar deposits distributed around the surrounding lower area. Dikes occupied the weak zone parallel to the principal stress derived from the Indian ocean plate movement. This Old Galunggung volcanic activity was in pre-historic times, probably between 50,000 and 10,000 years ago. This ended by intrusion of a body of magma (cryptodome) under the Old Galunggung crater.

The cryptodome plugged activity in the crater. Hence a new vent developed on the southeast flank of the Old Galunggung volcano. This vent migration followed the main fracture direction in the area. In 4200 years BP (before present), an extremely large event occurred which formed the horseshoe-shaped caldera of Galunggung. The southeast part of the volcano slid onto Tasikmalaya plain as a volcanic debris avalanche deposit to form "The Thousand Hills of Tasikmalaya". But some debris avalanche material remained within the caldera to form hills such as Gunung Bunder, Gunung Welirang and Pasir Linggajati. The slope failure is oriented along a tensional fracture zone in the area. During the eruption voluminous pyroclastic flows occurred. Most of the deposits formed were eroded and redeposited to become lahars. The center of volcanic activity has been inside the caldera since this period.

Historic eruptions occurred in 1822, 1894, 1918 and recently 1982-83. The 1822 Peleean eruption took place for only 3 hours on 8 October, but produced volcanic debris avalanche, pyroclastic flow and lahar deposits. Casualties were more than 4000 people, mostly caused by pyroclastic surge and flow. The next eruption occurred on 17-19 October 1894 as Vulcanian eruptions producing pyroclastic fall deposits. Although there was some damage caused by pyroclastic falls and lahars, there were no casualties in this eruption. A non-violent eruption occurred when a lava dome was extruded on 19 July 1918. It was preceded by earthquakes on 16 July followed by small explosions producing thin pyroclastic fall deposits around the crater.

Galunggung volcano had been quiet for 64 years before the eruption in 1982. The first eruption was on 5 April. The 1918 lava dome was destroyed during earlier eruptions (April-May; Peleean type) which produced pyroclastic flows as well as pyroclastic falls and some pyroclastic surge. Eruptions changed to vulcanian type in June-August after the 1918 lava dome was completely destroyed. Towards the close of activity (September-December), strombolian eruptions formed a cinder cone inside the crater. finally, a lava flow flowed out in the first week of January 1983. Lahars occurred during and after eruption in rainy seasons. Inside the active crater a lake formed shortly after the eruption terminated. This also happened after the 1822 and 1894 eruptions.

Petrography

Galunggung lava flows, lava domes, dikes and volcanic bombs, are basalt or basaltic andesite in composition and have porphyritic textures with medium-sized phenocrysts in fine-grained or glassy groundmasses. The most abundant phenocryst phase is labradorite, followed by clinopyroxene, olivine, orthopyroxene and magnetite. Amphibole occurs only in volcanic bombs erupted during the caldera forming event and at the beginning of each subsequent eruptive cycle. This mineral is also found in gabbro clasts ejected during some eruptions. Pumice clasts of rhyolite, were ejected in the 1982 - 1983 eruption.