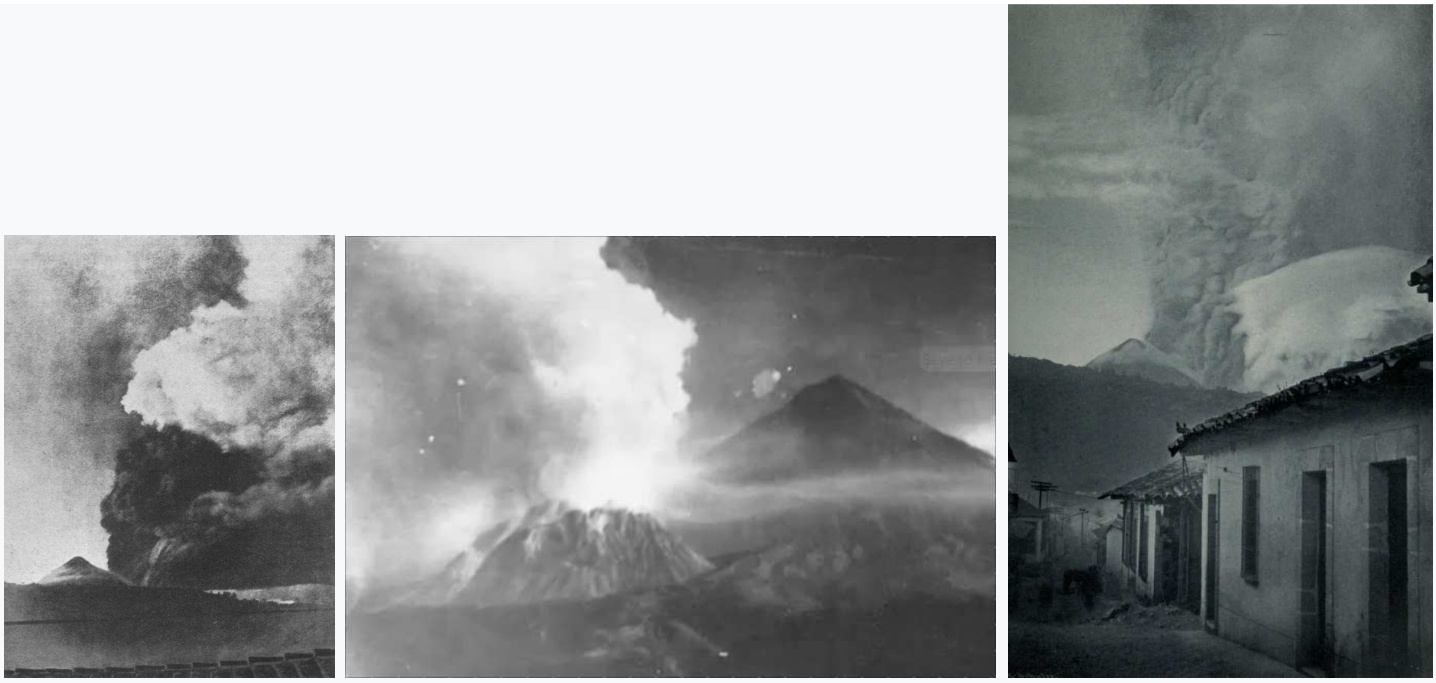
Santa Maria Volcano - Guatemala

Geologic History

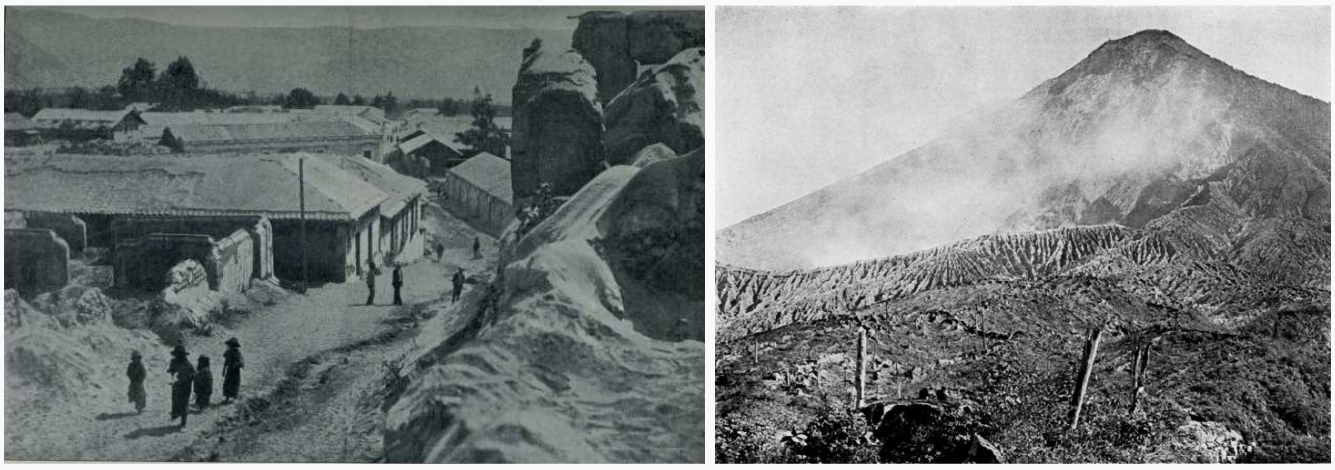
Santa María Volcano is part of the Sierra Madre range of volcanoes, which extends along the western edge of Guatemala, separated from the Pacific Ocean by a broad plain. The volcanoes are formed by the subduction of the Cocos Plate under the Caribbean Plate, which led to the formation of the Central America Volcanic Arc.

Eruptions at Santa María are estimated to have begun about 103 ka. Construction of the volcanic edifice occurred in four phases, from 103-72, 72, 60-46, and 35-25 ka [3][4], building up the large cone that reaches about 1,400 metres (4,600 ft) above the plain on which the nearby city of Quetzaltenango sits. Following the cone-building eruptions, activity seems to have changed to a pattern of long periods of repose followed by the emission of small lava flows from vents on the mountain.

1902 eruption



Santa Maria Volcano Photos (taken after the 1902 eruption,1903-1908)



Tempest Anderson, photo. *Swan Electric Engraving Co, Ltd.*

A RIDGE IN THE NEW ASH ON SANTA MARIA.

The first eruption of Santa María in recorded history occurred in October 1902. Before 1902 the volcano had been dormant for at least 500 years and possibly several thousand years, but its awakening was clearly indicated by a seismic swarm in the region starting in January 1902, which included a major earthquake in April 1902. The eruption began on 24 October, and the largest explosions occurred over the following two days, ejecting an estimated 8 cubic kilometres (1.9 cu mi) of magma. The eruption was one of the largest of the 20th century, only slightly less in magnitude to that of Mount Pinatubo in 1991. The eruption had a Volcanic Explosivity Index (VEI) of 6, thus being 'Colossal'.

The pumice formed in the climactic eruption fell over an area of about 273,000 square kilometres (105,000 sq mi), and volcanic ash as far away as San Francisco[*which?*], 4,000 kilometres (2,500 mi) away. The eruption occurred out of a vent on the southwest side of the volcano, leaving a crater about 1 kilometre (0.6 mi) in diameter and about 300 metres (980 ft) deep, stretching from just below the summit to an elevation of about 2,300 metres (7,500 ft). The first evidence of the eruption was a sprinkling of sand on Quezaltenango. The wind then changed from the south to the east and ashes began to fall at Helvetia, a coffee plantation six miles to the South-West.

Because of the lack of recorded eruptive activity at Santa María, local people did not recognise the preceding seismicity as warning signs of an eruption. Estimates are that 6,000 people died as a result of the eruption. In the middle of the disaster, Quetzaltenango regional authorities had to take charge, as the central government was focused on the celebration of the "Fiestas Minervalias", the largest propaganda festival of president Manuel Estrada Cabrera' regime; furthermore, the central government was so focused on the festival that it tried to minimize the impact of the eruption and went as far as tell the citizens that it was not in Guatemalan soil, but in México. Furthermore, the official government response was to tell Quetzaltenango authorities that there were no funds for the recovery, as those were already spent to help after the April 1902 earthquake. Under such circumstances, Quetzaltenango regional authorities declared that all the West zone agricultural harvest was ruined, and forecasted famine due to food shortages; likewise, cattle were dying and there were meat shortages as well. They were allowed by the central government to import flour free of taxes for the next few months. For the native people the eruption consequences were catastrophic: they not only lost relatives, friends, homes and harvest, but they were also forced to work free of charge in the recovery while "criollo" landlords were compensated by the loss with lands that were confiscated from native communities in San Miguel Uspantán Quiché Department, Panam in Suchitepéquez Department and in Sololá Department.

1902 eruption sequence of events

24 October: 5:00 pm: At San Felipe a sound was heard, similar to the roar of a waterfall, for five minutes, coming from the volcano; but the mist surrounding the volcano did not allow any direct observation of what was happening.

6:00 pm: Cinders and ashes started falling over Quetzaltenango

7:00 pm: Witnesses recall seeing lightning and a strong fiery red light coming from the volcano, and noise similar of that of an industrial furnace.

8:00 pm: From San Felipe one could see a giant plume of black ash with numerous whirlwinds crossed by thousands of lightning bolts and curved lines of red light. All the area surrounding the volcano kept shaking and large explosions could be heard as far as 160 km (99 mi) away; strong winds carried ash and debris as far as 800 km (500 mi) away, or even more; a part of the cloud hovered on the north side of the cone for days, and a pitch black darkness ensued.

25 October: 1:00 am: The eruption became more violent and large rocks from the volcano started falling as far as 14 km (8.7 mi) away, destroying towns and farm houses.

26 October: 12:00 am: The volcano calmed down.

3:00 pm: Another eruption, but this time it was a white plume that came out, which was likely composed of water vapor.