

Volcanology of Kasha-Katuwe Tent Rocks National Monument

Kasha-Katuwe Tent Rocks National Monument

is a unique and spectacular geologic marvel located about 40 miles southwest of Santa Fe on the flanks of the Jemez Mountains. Kasha-Katuwe, which means “white cliff” in Keresan, the traditional language of the people of Cochiti Pueblo, was created approximately 7 million years ago as part of pyroclastic activity from Jemez Mountain volcanic field eruptions. Conical tent-shaped rocks (called hoodoos), some with capstones, were formed through preferential erosion of the Peralta Tuff, mostly by water. Rocks more resistant to erosion protect the softer material beneath to form hoodoos.

The various rock textures seen at Kasha-Katuwe tell the story of several different styles of pyroclastic deposition. Some layers were formed directly from volcanic eruption deposition (pyroclastic)

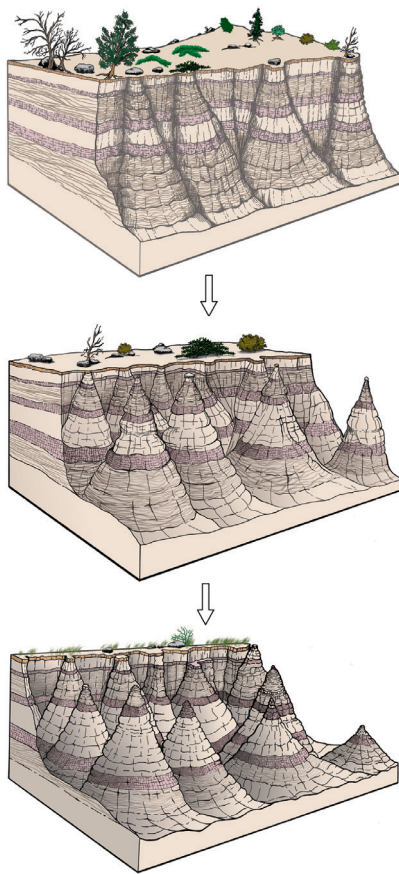


Kasha-Katuwe hoodoos with Cerrillos Hills to the left and Ortiz Mountains on the right, in the background. Photo by Cynthia Connolly.

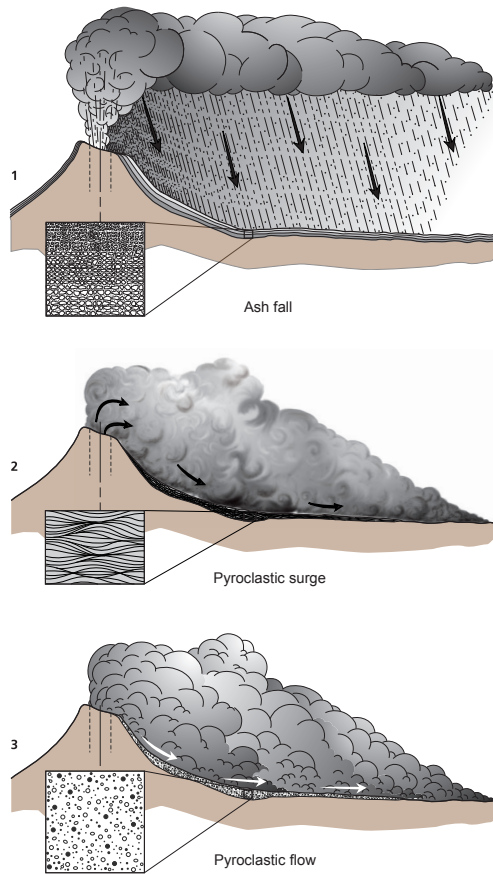
and other layers were deposited and reworked by wind or water (epiclastic). Deposits from several pyroclastic eruption styles can be seen. Ash-fall deposits commonly exhibit layered, planar bedding. Cross-bedding is indicative of pyroclastic surge deposits, where ash and pumice are transported in a cloud of hot, volcanic gas. Pyroclastic flows produce rock with indistinct bedding consisting of a various grain sizes, and also result directly from volcanic eruption.

After the deposition and lithification (process by which loose sediment is converted into rock) of pyroclastic and epiclastic material, several earthquake events produced a 350 foot offset of pyroclastic layers along a secondary fault associated with the Pajarito fault. The main Pajarito fault zone, located to the east of Kasha-Katuwe, has off set the 1.2-million-year old Bandelier Tuff by hundreds of feet indicating that some of these earthquakes must be younger than 1.2 million years. The presence of capstones on tent structures shows that there has been no major seismic activity recently, since earthquake motion would cause many of these balanced capstones to fall.

Another fascinating item that can be found at Kasha-Katuwe are “Apache Tears,” composed of dark- colored volcanic glass called obsidian. Obsidian is a product of rapid cooling of rhyolitic lava, probably close to the volcano. Fractures in the obsidian facilitate break-down of the larger lava flow into smaller pieces of obsidian, which are then transported by water and deposited alongside sand in sedimentary beds. The name Apache Tear, is derived from a story about a band of Apaches that were killed by the U.S. Calvary. The women of the tribe cried for their dead and their tears became immortalized as the Apache Tear obsidian fragments. When visiting Kasha-Katuwe, please do not take Apache Tears.



Following the deposition of thick layers of Peralta Tuff, erosion has shaped the receding cliff faces into “tents.” Large rocks more resistant to erosion protect the softer material underneath, resulting in the conical shapes we see today. From *The Geology of Northern New Mexico's Parks, Monuments, and Public Lands*, p. 157.



Several different lithologies are represented within the Peralta Tuff. From *The Geology of Northern New Mexico's Parks, Monuments, and Public Lands*, p. 154.