History of The Jemez Mountains

The Jemez Mountains -- General

Mar00 News Nuggets
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By Donna Scott

Tom Schmierer introduced Dr. Gary Smith as the speaker for the evening. Dr. Smith is a professor of Geology (AKA: Earth and Planetary Sciences) at the University of New Mexico. He presented his program with the aid of slides. He spoke of the history of the Jemez Mountains, which bates back 12 million years. He showed many familiar pictures, such as the numerous Bandelier tuffs and the Tent Rocks near Cochiti. He talked at length about the Valles Caldera, which is 15 miles across, east to west. Dr. Smith even disclosed some collection sites for Apache tears. The lecture was enjoyed by all. A question period followed the presentation. Thank You, Dr. Smith!

Geologic Highlights of the Jemez Mountains, New Mexico

Dr. Gary Smith
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The Jemez Mountains are coalesced volcanoes that began forming about 12 million years ago. The volcanic field sits astride faults that define the margin of the Rio Grande rift. As a result, the volcanic deposits rest on Paleozoic and Mesozoic sedimentary rocks, in the west, and overlie and interfinger with an increasingly thick succession of Tertiary rift-basin sediment toward the east. These faults controlled the ascent of magma and the location of volcanic vents. Volcanic activity between 12 and 2 million years ago covered a wide range of eruption types and magma compositions. The history of the volcanic field culminated in two large eruptions of pumice and ash at 1.6 and 1.2 million years ago. The indurated deposits of these eruptions, the Bandelier Tuff, are found on all flanks of the mountains but especially to the east and west. The center of the volcanic field collapsed to form large calderas during each eruption. The 13-mile-diameter Valles caldera formed during the youngest of the eruptions and contains a central mountain, Redondo Peak, caused by uplift of the caldera floor, presumably due to the intrusion of magma. In the moat between Redondo Peak and the caldera wall there were numerous later extrusions of pasty rhyolite to form lava flows and domes partly composed of obsidian. The most recent eruptions occurred about 60,000 years ago and produced additional deposits of pumice and obsidian. An active magma chamber remains below the Jemez Mountains and provides the heat source for hot springs and fumaroles within and near the southwest part of the caldera.

The Valles Caldera

Oct96 News Nugget
The Jemez Mountains (A Report from the NMGSF Conference)
By Tom Schmierer

A major portion of the Jemez Mountains is comprised of the Valles caldera. (Note the plural of Valle.) Prior to the recently completed New Mexico Geological Society Field Conference, the author and probably most everybody else were under tie impression that the Valle Grande was the only reasonably large valley in the caldera. On the north side of the caldera, hidden away from view, is the Valle Toledo which is associated with a small bulge to its north called the Toledo Embayment. On the southwest portion of the caldera is the Valle San Antonio.

Several years ago, the Club was given permission to visit the southwest portion of this Valle. It was thought that the sulfur fumaroles would be hot enough to cook eggs but it turned out that it would be necessary to stay there several hours before the eggs were cooked enough to eat. Fortunately, someone brought along some artificial heat. One could almost see sulfur being formed. It was formed much too fast to result in the formation of typical sulfur crystal. A member of the Club offered to get permission for the Club to again visit the area - perhaps next year.

The author was under the mistaken impression that all those domes in the caldera were resurgent domes. This type of dome is an up thrust phenomenon. Redondo Peak is such a dome and reaches an elevation of around 11,000 feet. Many of the other domes in the caldera are actually small "eruptions" of lava and, in some cases, include very nice obsidian. Many years ago, the Club was permitted to collect the black and mahogany obsidian on the back side of the dome which, from the highway half way across the Valle Grande, appears to have several horizontal lines - actually, the remnants of old logging roads.

The first eruption of the volcano was about 1.6 million years ago with a second large eruption about 1.1 million years ago. A recent study of some material along the highway resulted in a determination that a significant eruption occurred about 50,000 years ago. Carbonized wood was found and was carbon dated to approximately that date. The attendees of the Conference were offered the opportunity to reach in some of the opening to get a piece of charred wood. There were several volunteer until they were told that black widow spiders often lived in those holes. Prior to 1.6 million years ago, there were a number of lava flows from the volcano. One huge such event can be seen from the White Rock overlook. This one appears to be a couple hundred feet thick and extends southwards for many miles.