

Geology of Wupatki National Monument

Wupatki National Monument has a variety of geologic features, many of which can be seen from the visitor center. Some of the more prominent features are the Doney Cliffs to the north, Doney Crater to the northwest, Moenkopi sandstone, grayish terrace gravel deposits, and black lava flows, all to the east, and the dark gray Woodhouse Mesa, a basaltic lava flow to the southwest of the visitor center.

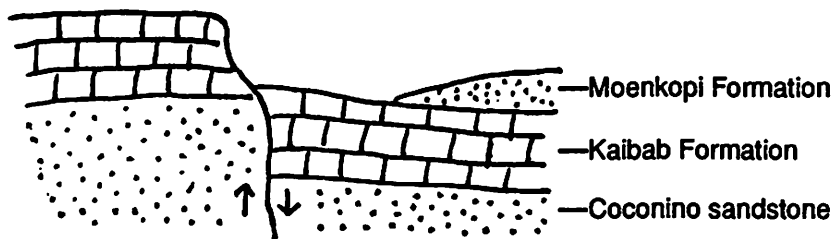
The Doney Cliffs are the large, buff-colored cliffs that run northeast from Doney Crater for four miles before changing into gentler terrain. The cliffs are formed by near-vertical faults that have raised the crust west of the cliffs. This feature is called a faulted monocline. A monocline may be thought of as a step-like fold, and is shown in the figure below. At the south end of the cliffs is the elongate cinder cone of Doney Crater, one of many craters found in the San Francisco Peaks volcanic field.

Wash. Here an ancient stream cut deeply into the Doney Cliffs. This white, cross-bedded sandstone was originally deposited as a field of sand dunes, part of a large, sandy desert that covered this area approximately 280 million years ago. Next a large, shallow sea covered the dunes. In this marine environment, the silty dolomites and limestones of the Kaibab Formation from the Permian Age were deposited, along with a variety of marine fossils.

The red rock formation which is prevalent throughout the monument is called the Moenkopi Sandstone Formation. It was deposited by sluggish streams flowing over a low coastal area. Many Sinaguan ruins were built on the lower massive sandstone which tends to form small, yellowish-red cliffs and mesas. It weathers into brick-like blocks used for masonry by the prehistoric Indians, and is visible primarily east of the Doney Cliffs.

Four different lava flows, of Pleistocene age, cover portions of the Moenkopi sandstone. Woodhouse Mesa is the oldest (1.1 million years), while the Doney Crater flow is the most recent (fifteen thousand years). River terrace gravel deposits, transported by the Little Colorado River over the last two million years, also cover the bedrock in some areas east of the cliffs. Remnants of four terrace levels can be seen, usually appearing as grayish, flat-topped caps of gravel over red Moenkopi hills.

Doney Cliffs



The oldest rock unit in the monument is the Permian Age (240 to 280 million years ago) Coconino sandstone, exposed only in the bottom of Antelope

The backcountry of Wupatki National Monument is administratively closed. Removal of any mineral, plant or animal is prohibited.

View of Doney Crater area. Fault line scarp and monocline through the center of the area is visible as well as an ancient river channel (Doney Channel). Note also the elongation of craters along the fault and the ancient flows to the south that cut off the headwater of Doney Channel (drawing by Pamela Lungé, courtesy Museum of Northern Arizona)

