

Kennesaw Mountain

National Park Service
U.S. Department of the Interior

Kennesaw Mountain
National Battlefield Park



Geologic Origins of Kennesaw Mountain



Metamorphosed Rock Outcrop on Kennesaw Mountain

Kennesaw Mountain National Battlefield Park is nestled in the Piedmont geologic province of north-central Georgia. This geologic province was formed between approximately one billion to 300 million years ago through a series of mountain building events or orogenies. In geologic time this period is known as the late Precambrian to the early Paleozoic.

Birth of the Piedmont



Georgia Geologic Province Map
Courtesy of USGS

The surface relief or topography of the Piedmont is characterized by relatively low, rolling hills with heights above sea level between 200 feet (50 meters) and 800 feet to 1,000 feet (250 meters to 300 meters). Its geology is complex with numerous rock formations of different materials and ages intermingled with one another.

Essentially, the Piedmont is the remnant of several ancient mountain chains that have since been eroded away. These mountains, at the time of their formation, looked like what the western Rocky Mountains do today. Isolated granitic domes of cooled magma also rise above the Piedmont landscape to create prominent features like Stone Mountain.

The position of the Piedmont Geologic region is best understood in terms of the collision of continents, or plate tectonics, that built the Ap-

palachians. At that time North America and Africa collided to make the Pangaea supercontinent.

Here in the southeast at the heart of the collision, intense transformation and heating deeper in the Earth generated the rocks of the Piedmont. These rocks were deeply buried in the collision, but erosion of the overlying mountain belts has subsequently exposed those rocks today. What remains are various types of metamorphic rocks such as schists, amphibolites, gneisses and migmatites, and igneous rocks such as granite.

The Appalachian mountain-building event, known as the Alleghanian Orogeny, occurred during the formation of Pangaea, which was one of the last of many such events here in the Southeast. The last major event in the history of the Piedmont was the break-up of Pangaea, when North America and Africa began to separate.

Topography of Kennesaw Mountain



Kennesaw Mountain is made up of three summits: the Big Kennesaw, Little Kennesaw, and Pigeon Hill peaks here in the Piedmont. At the time of its formation, Kennesaw Mountain was a part of a massive mountain chain whose surface has since eroded away, leaving behind tiny monadnocks, Native American (Abenaki Tribe of the Algonquian Nation) for “Lonely Mountain.”

Monadnocks are left as erosional remnants because of their more resistant rock composition;

commonly, they consist of metamorphosed sandstone known as quartzite and igneous rocks like granite.

Surrounding the Kennesaw Mountain summits are monadnocks that include the Sweat and Blackjack Mountains to the east and Stone Mountain to the southeast. These “lonely mountains” are visible from various lookout points along the mountain road.

The Brevard Fault Zone



Brevard Fault Zone Map
Courtesy of USGS

The Brevard Fault Zone represents the dividing line between the Northern and Southern, or Upper and Lower, Piedmont. A fault occurs when pieces of the Earth's crust move against one another.

This dormant fault zone is located in Georgia as well as Alabama and North Carolina. In Metro-Atlanta, entry into the Brevard Zone occurs at I-285N and Ashford-Dunwoody Road. An ancient fault zone that cuts across the state of Georgia from the southwest to the northeast, its last motion occurred about 185 million years ago. This fault zone is no longer active and presents no future earthquake concerns.

The Brevard Fault is the 100-mile long inactive fault line which the Chattahoochee follows through the Georgia Piedmont. It follows the high ridges and continues on towards Marietta where it shoots off to the west, leaving the state at the Alabama border close to I-20, I-575, and GA-515 closely parallel to the fault line.

Rocks in the Brevard Fault Zone are profoundly sheared and fractured. In Georgia, the rocks include mylonites, button schists, gneisses, graphitic phyllonite, sheared graywacke, and siltstone pockets of metamorphosed dolostone and limestone.

Geology of Stone Mountain



Image courtesy of
Pixdaus.com

In contrast to the metamorphic rocks of Kennesaw Mountain, Stone Mountain's origin is significantly different. It is a pluton, which is an igneous intrusion of cooled magma from beneath the Earth's crust.

Stone Mountain formed as a result of the rising of magma from within the Earth's crust. This magma solidified to form a quartz monzonite "granite" within the crust five to ten miles below the surface. The "granite" is composed of quartz, feldspar, and muscovite, with smaller amounts of biotite and tourmaline.

The dome of Stone Mountain was formed some 300 million years ago and intruded into the metamorphic rocks of the Piedmont region during the last stages of the Alleghenian Orogeny 300 million years ago.

When granitic rocks are moved to the surface by tectonic processes, the pressure is released and the granite expands slightly, resulting in exfoliation, creating a smooth surface. At its summit, the elevation is 1,686 feet (513 meters) above mean sea level and 825 feet (251.5 meters) above the surrounding area.

Stone Mountain granite extends underground 9 miles (14 kilometers) at its farthest point into Gwinnett County. The mountain is more than five miles (8 kilometers) in circumference at its base.

The top of the mountain is a landscape of bare rock and rock pools, and it provides views of the surrounding area including the skyline of downtown Atlanta, often Kennesaw Mountain, and on very clear days even the Appalachian Mountains.

Geologic Importance to the Civil War



Kennesaw Mountain's geology played a large role in the advancement of Maj. Gen. William T. Sherman's Union troops toward Atlanta.

All throughout north Georgia, Sherman had advanced his army southeast along the railroad from Chattanooga, Tennessee, towards Atlanta, Georgia. Lt. Gen. Joseph E. Johnston would take up defensive positions, only to retreat whenever Sherman marched his troops around the Confederate army to flank them. At Kennesaw Mountain, Johnston had a massive network of trenches and earthworks prepared to halt the Union advance. This time, when Sherman tried to march his army southwards around Kennesaw, he was met by an

attack at Kolb's farm from Confederate troops under the command of Lt. Gen. John B. Hood.

Although the Union soldiers repelled Hood's hastily prepared attack, Sherman's army could not flank the Rebel army any further.

Stone Mountain did not prove to be as useful a landscape for the entrenchment of Confederate or Union troops during the Civil War. It did prove a good area for settlers, in part due to the establishment of the granite quarry in 1849. The quarry remained open until 1978 under the ownership of various companies. A small outdoor museum resides there today.

Your Role in Conservation and Preservation

We encourage your support to keep our trails and environment clean. All geologic specimens, buildings, historic objects, plants, and animals are protected by federal law.

Stay on the roadways and trails so as to help prevent erosion and to protect the mountain terrain. Many volunteer opportunities are available to preserve the heritage of this ancient landscape.

If you are interested in one of our volunteer opportunities, contact the Kennesaw Mountain

Trail Club at 770-427-4686 or via the Internet at <http://kennesawmountaintrailclub.org>

If you would like to learn more about geology please visit www.usgs.gov or www.atlantageologicalsociety.org.

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