Mesa verde national park research paper sample

Science, Geology

The National Park is located in the Montezuma County of Colorado in the United States. This park is the largest and elemental archaeological preserve in the country. It was developed in 1906 by the then president to preserve the existent cliff dwellings. These cliff dwellings are among the park’s most and best preserved attractions. The park occupies around 81. 4 square miles close to the Four Corners and has numerous ruins of villages and homes built by the Anasazi people, also known as the Ancient Pueblo people. The park features more than 600 cliff dwellings and has more than 4000 archaeological site. Several factors contributed towards the mesa formation. The processes involved in the formation of the mesa and the cliff dwellings are of geological explanation. These processes occurred in stages and seasons that influenced their formation and existence today. This paper identifies the geological history of the formation processes of the Mesa and the processes involved in its formation. Moreover, formation of the cliff dwellings was also influenced by certain processes, which will be discussed in this paper.

Geological Background

During the late Cretaceous period, there was a deposition of the Mancos Shale on the Dakota Sandstone. This sandstone is the rock formation predominant in most parts of Colorado. The Mancos Shale beds comprise of fine-grained shale, mudstones and sandstones. These fine-grained materials gradually formed accumulations in the Cretaceous Sea's deep waters. The fine grains and the deep-sea bed layers contain content that is high in clay. The high-clay content expands gradually when wet leading to the sliding of the prevalent terrain. On top of the shale, three distinct formations that

occur in the Mesaverde group are responsible for the transformations and changes that occur in the depositional surroundings with time. The first process is the formation of the point lookout sandstone. This sandstone formed from the inward recession of the Cretaceous sea and was deposited in the shallow waters of the marine environment. The layers of the sandstone comprise of very resistant, cross-bedded, fine-grained and massive materials. These materials reflect the currents and waves that were prevalent during the time of formation. The upper layers contain fossiliferous invertebrates with sediments of approximate thickness of 400 feet.

The Menifee formation was the next process of formation. Contents of this middle formation feature interbedded sandstones, siltstones and carbonaceous shale. These materials were deposited in the semi-marine environments of the surrounding brackish waters in swamps, lagoons and bays. The organic matter and the depositional environment lead to the formation of thin coal seams that run through the entire Menifee formation. This Menifee formation inter-fingers with the cliff house sandstone at the top.

The youngest layer of rock in the Mesa Verde is the cliff house sandstone. This rock layer formed after the complete recession of the Cretaceous sea, which resulted in high sand materials from dunes and beaches among others. These sand materials eventually led to the characteristic yellow feature of the canyon appearance. This rock layer contains many fossil beds of variant types of invertebrate leftovers, fish teeth and shells from the receded Cretaceous sea. The shale zones predominant in this feature determine the location of the alcoves formation in the dwellings of the Anasazi Indians.

As the area experienced continual transformation of periods from the Cretaceous to the tertiary, there was a continual uplifting in the regions of the La Plata Mountain, Colorado Plateaus and San Juan Mountains. This uplifting caused the formation of the pediment of the Mesa Verde through erosion. Tiny channels of running water scooped materials as they accumulated in the formation leading to a deposition in the depositing gravel. In the later durations of this tertiary period, there was gradual uplifting and tilting of the rock layers towards the south of the region. This tilting and uplifting caused the stream and channels of water to cut rapidly and deeply into the rock material (Road Guide to Mesa Verde: What to Do & See in Mesa Verde National Park : History, Geology, Natural History, Hiking Trails 19). This deep undercutting led to the removal of loose sediments on the bedrock leading to the formation of the vast canyons. The formation of the canyons caused an isolation of the pediment of the Mesa Verde from the surrounding rock. Combined mechanical weathering and erosion assisted in the formation of the alcoves. Moreover, processes from the sea wave movement assisted in the formation of the cliffs. Mechanical weathering combined with glacial activity led to the formation off dykes and ridges. Continued freeze-thaw action in these dykes and ridges resulted in the formation of canyons. The wave actions from the sea like wave erosion also assisted in the formation of seep springs from the groundwater.

The Mesa

Several processes were involved in the formation of the mesa. However, unlike common knowledge, the mesa is not a mesa but a cuesta. It is presumably a cuesta because it has flat-topped protrusions and steep cliffs.

Moreover, the feature slightly tilts in one direction. The mesa tilts to about seven degrees towards the south. This sharp inclination was very elemental in the formation of the alcoves, which are among the most captivating features of the Mesa Verde.

The Colorado Plateau Province

The Mesa Verde Park stretches to about 81 square miles in the Province. This plateau contains monoclines that stretch out into New Mexico, Arizona and Utah (Harris, Tuttle, and Tuttle 26). The high and flat feature of the plateau also assisted in ensuring there was free flow of underground water because of its sloping characteristic.

Sandstone and Shale

The dwelling cliffs in the park comprise of erosion-resistant sandstones. The sandstone prevalent in the region is porous, which means that water can flow through it easily. The shale forms slope below the cliffs. These slopes are not erosion-resistant. This difference in porosity and permeability of thee sandstone and the shale leads to the formation of springs from groundwater. These springs seep into the canyon walls (Griffitts 20). The sandstone layer of rocks and the shale layer of rocks are the predominant rock types in that region. These rocks differed in permeability and porosity and played a significant role in the formation of seep springs.

Carving Tools

The Mesa Verde contains different dykes. These volcanic dikes form from erosion. As vulcanicity leads to the formation of plateaus and volcanic hills and mountains, water collects in these features from rainfall. Continual

freezing and thawing action of the percolated water results in the formation of dykes and ridges, which define most of the land areas. In the Menefee formation, the dikes in the Mesa Verde lead to the formation of normal ridges. However, in the mesa’s top and the cliff house sandstone, the dikes left sharp-sided gullies and slots (Erdman, Douglas, and Marr 10). The Pleistocene era created glaciers, which later influenced the formation of these valleys, peaks and ridges. As the ice sheets flowed through the area, there was alternate freezing and thawing action of the glacier.

Alcoves

The alcoves formed from alternate freezing and thawing by groundwater seepage. The formation of these alcoves is assisted by water that absorbs into the sandstone and percolates through the pore of the rock. The flowing water eventually reaches the layer of shale. This layer of shale is less absorbent and porous than the sandstone. Since the groundwater cannot easily pass through a layer of shale, gravity guides it to the face of the cliff but along the top of the shale layer. As the water emerges from the face of the cliff, directly above the layer of shale, seep springs form. In the ancient times, these seep springs were a source of water for the inhabitants of the alcoves. As the groundwater undergoes freezing and thawing, pressure is exerted on the outward rocks of the cliffs leading to the formation of alcoves. This process of alcoves formation is continual up to date. The outward rocks that are pushed outside by the pressure were later used by the Pueblos to construct dwellings (Carrara 18). Later, they established settlements in the alcoves. Water was flowing through the alcoves dissolved the calcium carbonate, which kept the blocks of the sandstone intact. As these sandstone

blocks crumbled, they created sand, which was washed away by the flowing water, blown away by wind or washed away by the rainstorms. These alcoves are large and arched recessions that form in a cliff. The Pueblos used the sand and silt as a component of their mortar mix.

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