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Mandeep Khole Caves : A Classical site of Karst Topography, Rajnandgaon District, Chhattisgarh, India

P.K. SHRIVASTAVA*, N.P. DIXIT**, A. ASTHANA*** and P. KULKARNI ****

*Department of Geology, Govt. V.Y.T.P.G Autonomous College, Durg (C.G.) (INDIA)
**Department of Physics, Govt. V.Y.T.P.G Autonomous College, Durg (C.G.) (INDIA)
***Department of Chemistry, Govt. V.Y.T.P.G Autonomous College, Durg (C.G.) (INDIA)
****Department of Botany, Govt. V.Y.T.P.G Autonomous College, Durg (C.G.) (INDIA)

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Abstract

Mandeep Khole cave is situated about 30 km away from, Gandai Block of Rajnandgaon district head quarter of Chhattisgarh state on Rajnandgaon - Balaghat road. One can approach this cave through Thakurtola village. This cave is full of stalactites and stalagmites alongwith thousands of other Karst topography features. Once, inside the cave, one founds large, amphitheatre-like halls with endless galleys connected to similar halls of varying size and shape. The Mandeep khole cave is dark inside but when lighted by torch or other sources of light, of any type, the reflection of light enlivens the internal environs and the caves seen to radiate a million crystal colours off its walls, stalactites and stalagmites. The cave is large enough inside to facilitate easy movement within them.

Mandeep khole cave is dark and frightening but it can be a lot of fun too, provides a sense of excitement you can not relish unless you are pi through their dark. The main entry to this cave is through narrow triangular opening. This beautiful cave is of Precambrian age. Mandeep khole is much more than just dark, scary holes in the ground. The present study gives some more general and in depth information of Mandeep khole cave.

Formation of Mandee pkhole caves:

Caves can be formed by various processes. Based on the forming process primary and secondary caves can be distinguished. Primary caves are formed during the same time as the original rock/mineral is formed. Types of these caves are lava caves and coral caves. On the other hand, secondary caves are formed after formation of the rock. They can be formed by wind erosion, by the surf of the sea, by tectonic forces of the earth and by limestone dissolving in water. Cave formation is a process of many thousands to million years. The study of caves is known as speleology.

The process of lime dissolvement occurs according to the following reversible chemical equation.

$$CaCO_3+H_2O+CO_2 \sim Ca_2+2HCO_3$$

Water (H_2O) that is a bit acidic by the

dissolved carbondioxide (CO_2) will react with the limestone ($CaCO_3$). The limestone dissolves. This means that regarding the equation, the process will go from left to right. The carbon dioxide can originate from the air where this gas only forms 0.3 percent of the total. In soil with active mineralization of organic material, the CO_2 concentration can be enormously elevated. In rain water percolating through these soils much CO_2 can dissolve, making the water much more acidic. This way the equilibrium is forced to the right, thus dissolving much more limestone. Caves formed by this process is called Karst caves, after an area in former republic of Yugoslavia. Mandeep Khole cave is also an excellent example of Karst topography.

The Mandeep Khole cave in the limestone of Chhattisgarh super group are mainly formed in the period when they were fully submerged with ground water. Then the process of limestone dissolvement and erosion by running water is combined. The above mentioned chemical reaction is reversible. This is visible in the inside of Mandeep Khole caves. In the original acid rain water lime is dissolved until equilibrium is reached. When this water drip out of the wall or ceiling, CO_2 will disappear into the air, forcing the equilibrium to the left. Lime will then precipitate, forming speleothems or cave formations.

Another important cave forming factor is the case with which parts of the cave break. By collapsing, big chambers are formed, and sometimes even opening in the roof of caves. When a cave is still submerged in water and collapse, these parts can partially dissolve. If the cave is already dry, the collapsed parts will remain as the origional area. Once the ground water level is below the bottom of cave and the process of dripstone formation ends, cave forming processes end. A cave is this stage can be called a dead cave.

Mandeep Khole is purely formed in limestone terrain. It can be divided into five different terraces or parts or floor. These five floors differ in age, the highest floor being formed first and the others formed lateron.

Importance of Mandeep Khole Caves :

This Mandeep Khole cave served as shelters for the inhabitants and not as dwellings. Speleothem is another word for cave formation. Several forms of speleothems are distinguished in the Mandeep Khole cave, out of which some most important speleothems are stalactites, stalagmites, flowstone, rim stones.

Dripping water, saturated with calcite, will form a stalactite, hanging from the wall or roof of a cave. The first drop of water will leave a little bit of calcite behind, according to process described earlier. Drop by drop the calcite forms a hollow tube like a soda straw, guiding the drop of water. The tube will usually became plugged, forcing the water to flow down the outside. This way the icicle looking stalactite is formed. Where stalactites are hanging, the stalagmites are standing. Often under a stalactite a stalagmite is growing. The drops of water leaving the stalactite splash on the ground, and will leave a bit if calcite behind forming bit by bit a reversed icicle. Slowly but steadily, the stalagmite and stalactites are growing. Some times the slalactites and stalagmites grow together forming columns. It is called "Dripstones".

According to experts in this field, the growth rate of speleothems is 1 millimeter per century on average. A stalactite of 1.5 cm equals, an age of 1500 years, while it can be broken in the twist of an eye.

In Mandeep Khole cave, by the same process under different conditions other types of speleothems are formed. *Flowstone* is formed when a then film of water flows down the wall or floor. A smooth layer of calcite is deposited. Sometimes the flowstone forms a terrace like landscape also called *Rimstone.* This Rimstone can be seen very easily in the Mandeep Khole cave.

Ecological Importance :

Mandeep Khole cave is a habitat for a variety of bacteria, small insects and animals. Among them, the bats are the most studied. They are encountered in big numbers in the darkest and remote recesses. A cave dwelling insect typical cave spider is also found in this cave. A lot is still unknown about the animals and other forms of life in the caves.

Visiting a cave is not an every day activity, caves are a totally different world and causes one to feel astonished, frightened, excited or even relaxed. It is always impressive to experience it. However, visitors can, whether or not deliberately, damage the caves and their values. In the Mandeep Khole cave, also we can see broken stalactities and stalagmites. Much can be done by informing people about cave characteristics and their values. Once we realize that caves are much more than just a hole in the ground we will be more careful. Another possibility to protect caves and cave life is to encourage people to be a responsible cave visitor.

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References

1. George V., Revising the Karst map of United States, *Journal of Cave and Karst studies, 64 (I)* pp 45-50 (2005).
2. Moore, G.W. and Sullivan, G.N., Speleology; The study of Caves Teaneck, New Jersay Zephyrus press 150p (1978).

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