

How to Preserve the Environment of Natural Caves

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1. Introduction

If caves are opened, most of caves experience cannot help undergoing damage or destroy by tourists and other serviceable facilities. But it is our subject how such damage and contamination can be prevented or reduced in advance.

Second creatures (cave sediments) such as stalactites and stalagmites are to have been created for a long time. Some of them might be grown for ten or twenty thousand years. When they are damaged or destroyed, they will not be absolutely recovered to the original state. Therefore, the perpetual preservation measure is required.

The advanced countries have conducted continuous researches and experiments to preserve the cave's ecology and protect it from environmental contamination for years. In Korea, a preventive measure

against green pollution or separation pollution has been experimenting for Gosu Cave in Danyang. However, the remarkable performance has not been shown yet.

2. Why does the environment preservation of caves need?

The environment preservation of caves is to preserve the cave's ecology and to maintain the continuous growth of speleothem in the cave.

The cave is a dark world which has kept constant temperature and humidity for many years. Thereby speleothem and underground living things have been completely preserved.

In fact, speleothem in the cave are closely related to the rock structure and component of the upper layer of the cave, the permeability and quality and permeable

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state of underground water, the stratum's array, and the airflow, humidity, and temperature of the cave.

For instance, the size and growth speed of cave sediments are inevitably subject to the cave's environment. Therefore, various measures to preserve the environment of caves must be prepared.

That is to say, open caves needs to equip weather observation facilities to collect basis data which is applicable to control the rise of temperature and the decrease of humidity in the cave by tourists. That is why we can grasp an environmental change in the cave and take a proper measure against it based on the weather observation data.

3. Conclusion – What is there for pollution and preservation measure?

The attraction of cave sightseeing arouse our curiosity for a mysterious underground world and enables us to observe and feel the mystery of a subterranean palace formed by speleothem as if it is a pandemonium. Therefore, the appearance of landforms and things in the cave are directly connected with an academic value.

In addition, cave sediments such as

stalactites and stalagmites are continuously growing stones. But its growth speed is very slow. So, it is known that even soda straws or stalactites with the fastest growth speed need about 15 years for the growth from 5mm to 1cm based on the average value estimated in Korea.

The estimated value may be greatly different depend on the upper geological structure of the case, weather conditions of the ground surface on the cave, and environmental conditions in the cave.

The scenery of caves has been gradually spoiled and destroyed by senseless people's behaviors and an impact when they were initially developed, etc.

The countermeasure against the damage of scenery and sediments as mentioned above is suggested as follows:

(1) To preserve the cave's environment and continuously grow speleothem, that is, grow the cave's inside, regular artificial water spraying on the ground surface of the cave is required.

(2) Development for opening must focus on keeping the environment of caves as it is. Therefore, the peripheral or internal

environment of caves must be not damaged by excessive works of entrances and serviceable facilities.

(3) To protect and preserve the ecology of the ground surface, calcic rock soil must be preserved. That is to say, we must ensure calcic soil strata and regularly rotate terrain by protecting vegetation and terrain on the ground.

(4) Education to inform tourists of the importance of cave sediments in advance is required. For this, proper guidebooks etc. must be distributed.

(5) Tourists must be prohibited from carrying anything which may spoil or contaminate the inside of cave. For this, an article depository must be separately prepared. In particular, it is because articles such as sticks and umbrellas become main factors that can damage cave sediments.

(6) All potential places of soil collapse or rock dropping in the cave must equip any special preventive measure. Especially, the hazard factor must be removed in advance when the ground's vibration is expected.