THE MC1 CAVE ON THE MT. ETNA AND ITS PECULIAR METASTABLE SPELEOTHEMS

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On the Mt. Etna volcano, at the top of the Bove Valley, a new cave was found in the lava flow of 1991-93 and explored when its internal temperature was still high (over 80°C). This allowed the discovery of some peculiar speleothems, whose development was strictly controlled by temperature and humidity.

The cave is a classic lava tube, its total length is about 800 meters with diameters ranging between 5 and 8 meters and the entrance is a small hole opened at 1900 m a.s.l. reaching the ceiling of the main gallery.

When the first caver entered the cave he found the walls and the ceiling almost completely covered by large speleothems (stalactites, stalagmites, helictites) normally snow white in colour, but in some places blue, pale green, orange to reddish formations have been seen.

The preliminary analyses proved that thenardite was practically the single component of all the speleothems; the same mineral was found some years ago in another lava tube still hot on Mt. Etna.

The thenardite is metastable in the normal meteorologic conditions of Mt. Etna changing to mirabilite and therefore we decided to keep the evolution of the MC1 speleothems under control with respect to temperature and humidity in order to achieve new data on the stability range for this mineral and the natural conditions which cause its transformation into mirabilite.

After a few months, when the mean temperature of the cave was lowered to 25 °C, the speleothems were partially changed in shape and composition: besides some thenardite was transformed by dripping into mirabilite, alunite, bloedite, halite, hesaedrite, picromerite, sylvite and trona have been found as components of the cave formations.

This fact has proved that the early weathering of lava beds may cause the deposition of several different metastable minerals inside the lava tubes of Mt. Etna instead of the single thenardite, as thought until now.

The monitoring of the cave is still in progress and it will last until the temperature will reach the normal value (10 °C) and all the metastable minerals will be washed away by dripping, which is forecasted for the spring of 1995.

In the MC1 cave it was also possible to make interesting observations on the aerosol induced speleothems: in fact in this cave plenty of very thin thenardite helictites (needle like filaments) and some thenardite rims, clearly related to aerosols, were still growing at the time of our first explorations close to strong uplifting hot air flows emerging from cracks in the walls and in the floor of the lava tube.

Finally close to the bottom of the cave there was a small hole in the floor blowing a very hot air flow: tuffs of very thin blades (1-2 mm in length) were growing all around this hole clearly due to the aerosols transported by the air flow. The colour of the blades was shining yellow to reddish-brown and the analyses proved that they were composed principally by hematite, with some tenorite and polyhalite (the last two being completely new minerals for the cave environment).

This study, though preliminary, on the metastable speleothems of the MC1 cave confirmed the idea, which was suggested only a few years ago, that the volcanic environment is perhaps the most interesting one for the study of the cave minerals.