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ABSTRACT BOOK

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**Geology for a sustainable
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Politecnico
di Bari



Monitoring of lampenflora growth on speleothems exposed to LED lights in show caves

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Speleothems, geological formations by mineral deposits that accumulate over time, are the major show caves attractions. However, they are often subjected to alterations linked to tourism, including the so-called “lampenflora”. Lampenflora is a community of photosynthetic microorganisms, mainly diatoms, cyanobacteria, and green algae, which sometimes also include mosses, ferns and higher plants, carried into the cave by tourists, water, gravity, air circulation and animals.

Lampenflora development on speleothems in show caves is due to the installation of artificial lights, which allow the photosynthetic activity in an otherwise dark environment. The lampenflora growth causes physico-chemical and aesthetic damage to speleothems, and changes the subterranean ecosystem modifying the food chain and damaging the autochthonous organisms. Moreover, microorganisms activities can release acid substances that lead to the deterioration of the formations surface.

Although in recent years lampenflora presence has been increasingly monitored in show caves from a biological point of view, geological modifications on surface of speleothems are less studied, such as the impact of the new LED lamps. This work aimed to give operational indications after two-year of studies to verify lampenflora growth after the installation of LED lights systems, and evaluate changes in calcite crystal habits over time, due to lampenflora growing. Homogeneous speleothems slabs without lampenflora were used for the test, as natural substrate, totally compatible with the formations in the examined cavity. Different slabs were positioned in several points of the cave along the tourist paths, at different distances and angles from the LED lamps. In this work, first results applied to Bossea cave, Italy, were reported such as example of application of this protocol. The results of this preliminary study can be the starting point for future and more complete monitoring in show caves, useful for the protection of the geological and environmental heritages.