

The conservation of the Nerja Cave: Preserving anthropogenic impact in a tourist cave

Yolanda del Rosal

Nerja Cave Foundation, Research Institute, Carretera de Maro s/n, Nerja, Malaga, Spain

Cristina Liñan

Nerja Cave Foundation, Research Institute, Nerja, Malaga, Spain

Centre of Hydrogeology of University of Malaga, Department of Geology, Faculty of Science, University of Malaga, Malaga, Spain

Mariona Hernandez-Marine

Department of Plant Biology, Faculty of Pharmacy, University of Barcelona, Barcelona, Spain

ABSTRACT: The Nerja Cave is developed within dolomitic marbles belonging to Sierra Almiñara, some four kilometres East of Nerja in the province of Malaga (Spain). The cave, with a nearly horizontal development, has a total surface of 35,000 m². It was discovered in 1959 and open to visits one year later. With about 450,000 visitors per year, the Nerja Cave represents a very important natural and cultural resource for the tourism industry of the region where it is located. The important archaeological site of the cavity motivated its declaration as Good of Cultural Interest with the category of Archaeological Zone. In addition, Nerja Cave is internationally recognized as Heritage Sight of Geological Relevance. Moreover, animal endemism and singular speleothems raise the Nerja Cave as highlight of the Natural Heritage of Andalusia. Since it was discovered, many research projects have been carried out in the cave, on geology, hydrogeology, microclimate and microbiota, among others. The results allowed the identification of natural or anthropogenic elements which can be a risk for the conservation of the cultural and natural heritage of the Nerja Cave and also the design and application of the most appropriate preservation protocols. Among these, delimitation of the protection area, assessment of the anthropogenic impact in the cave and the gradual replacement of unsuitable materials previously used in the tourist track. Additionally, specific protocols are being developed to reduce the photosynthetic biofilms which cause biodeterioration and/or aesthetic damage to surfaces.

1 INTRODUCTION AND SITE DESCRIPTION

Caves may answer question related to the biology, geology and archaeology of the subterranean environment. These fragile ecosystems can be disturbed by many anthropogenic and/or natural factors. In tourist caves, visitors or the introduction of foreign materials to facilitate the visit, induce the anthropogenic impact and, generally, this alteration uses to be higher than natural alteration. Therefore, one of the main goals of the managers of tourist caves is to control the human impact, according to their conservation.

The Nerja Cave, a Good of Cultural Interest, in the category of Archaeological Site and an internationally recognized Heritage Sight of Geological Relevance, is one of the most important tourist caves in Spain, with 485,541 visitors annually for the period 1988–2013. The cave was discovered in 1959 and opened to the public one year later. It has a volume of 300,000 m³, and about a third of the cave, the Tourist Galleries, is open to tourists while other parts, the High and New Galleries, is only visited by researchers and reduced groups of tourists (Fig. 1).