

Epigenic CO₂ Controlling the Drip Water Chemistry and Speleothem Growth in a Mediterranean Karst Area (Nerja Cave, Southern Spain)

B. Andreo, F. Carrasco, C. Liñán and I. Vadillo

Department of Geology, Faculty of Sciences, University of Málaga, E-29071,

Málaga, Spain.

andreo@uma.es

1 Introduction

The Nerja Cave is an experimental site to study of non-saturated zone in the Mediterranean karst and has been investigated by the Hydrogeology Group of the University of Málaga (GHUMA) since 1991. The cave is located in Andalusia (southern Spain), in the province of Málaga, about 5km east of the coastal town of Nerja (Fig.1A).

The cave has three entrances, two of which are natural and a third is artificial, created in 1960 for tourist entry. It comprises two sectors (Fig.1B): an area accessible to tourists (the Tourist or Lower Galleries), which occupies approximately a third of the total volume of the cavern, and a restricted area (Higher Galleries and New Galleries), the remaining two thirds, only visited by occasional groups of researchers and speleologists.

The cave extends almost horizontally between limits of 123 and 191m a.s.l, and occupies a volume of about 300,000m³. The largest galleries are mainly oriented N35E in the tourist area and N-S in the restricted areas, which coincides with the principal fracturation lines (Sanz de Galdeano, 1993).

The climate outside the cave is typically Mediterranean, with a mean annual temperature of 17.3°C, ranging from 8.1°C in January to 27.8°C in August. Mean annual rainfall is 500mm, although it is irregularly distributed, with a wet season from October to February and a dry season during the summer.

The Nerja Cave is one of the most visited natural sites in Andalusia (on average, 500,000 visitors per year), and so requires extensive research into environmental parameters and the physical and chemical characteristics of the water, both within the cave and outside it. The research concerning karst processes in caves has been developed specially in the last years, both on water chemistry (Borsato, 1997; Genty and Deflandre, 1998; Sánchez-Martos et al., 1999; Liñán et al., 1999) and environmental parameters (Cigna, 1993; Pulido et al., 1997; Hoyos et al., 1998; Mangin et al., 1999). This paper presents results obtained by GHUMA on Karst Processes and the Carbon Cycle in the experimental area of the Nerja Cave, according to the