

4th International Symposium on Karst, Málaga, Spain, 27th-30th April 2010

FIELD TRIP IN THE CENTRAL PART OF MALAGA PROVINCE, 29th April 2010

Maximum distance to Malaga city: aprox. 80 km

Departure: 9:00

Arrival: 19:00

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ALTA CADENA

Alta Cadena is an elongated and narrow carbonate mountain range located in central area of Malaga province, 40 km north of Malaga city. The relief is rugged, with altitudes ranging from 600 to 1640 m a.s.l. The prevailing climate in the zone is temperate Mediterranean. The mean annual precipitation is 650 mm and mean annual temperature is 16 °C. Alta Cadena is situated within the Betic Cordillera and is constituted by a very thick Jurassic carbonate formation (dolostones and limestones). These rocks represent an important groundwater body with a surface area of 70 km² that is mainly drained toward springs located at the northern edge of the sierras, towards Guadalhorce river hydrographic basin.



Alta Cadena general landscape



Cien Caños spring

TORCAL DE ANTEQUERA

Torcal de Antequera is one of the most spectacular and unusual karstic landscapes in Spain. This massif belongs to the Penibetic domain, forming part of the External Zone of the Betic Cordillera.

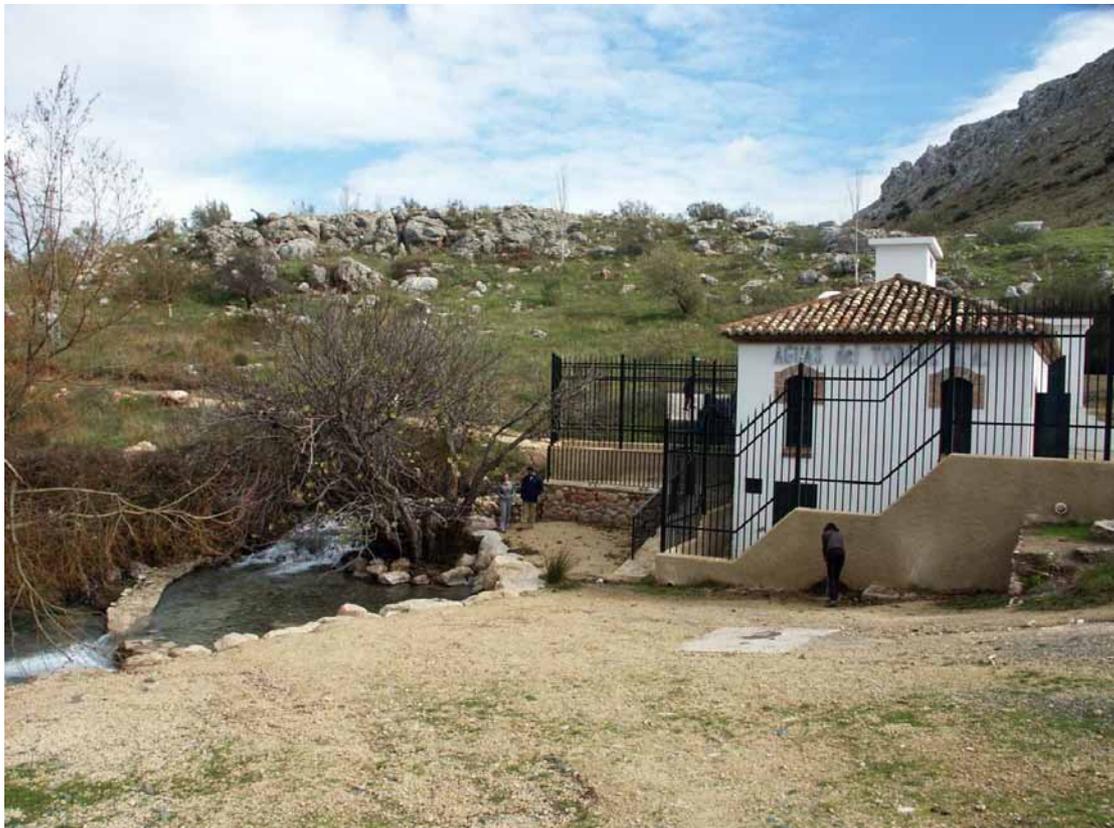
The relief of the Torcal de Antequera, is geomorphologically unique as consequence of the lithostratigraphy and the structure of the Mesozoic rocks that constitute the massif. The general structure is an anticlinal fold oriented NE-SW with a coffer shape, so the layers are subhorizontal in the upper part, while the limbs present greater dipping, becoming subvertical or even inverted, as can be seen at the southern border.

The exokarstic landscape is the most characteristic and spectacular feature of the Torcal de Antequera, and is most highly developed in the upper part of the massif, Torcal Alto, where a flattened plateau coincides with the above-mentioned horizontal beds. A wide range of karstic forms exist: karren, corridors, residual reliefs and closed depressions.

Torcal massif presents endorreic drainage, with highly developed absorption forms where recharge water infiltrates towards the endokarstic flow pattern. The aquifer has a recharge area of 35 km² and its mean resources are estimated to be around 15 hm³ per year. Over 85% of this volume is drained towards the most important spring, called Fuente de la Villa, which is used for water supply to the city of Antequera. Recharge to the aquifer is exclusively by precipitation (800 mm per year), and the coefficient of infiltration is about 51-55%.



Exokarstic landscape in the Torcal de Antequera



La Villa spring

FUENTE DE PIEDRA WETLAND

Fuente de Piedra is a wetland of exceptional interest at regional and national levels, and one of great international importance in the context of protecting biodiversity, is included in the Ramsar International Convention, which was ratified by Spain in 1982. It is a continental, karstic wetland that lies over evaporitic rocks and contains saline water of a sodium chloride facies

Fuente de Piedra lake is situated in the north of the province of Málaga, at an altitude of 410 m a.s.l. It is almost elliptical in shape, with longer and shorter axes 6.8 and 2.5 km long, respectively; its perimeter measures 18 km and it has a surface area of 13 km², measuring the normal extension of the water. Fuente de Piedra is the largest lake in Andalusia and one of the largest salt lakes in Spain. The water rarely exceeds 2 m in depth in conditions of maximum storage. It is a seasonal lake, usually drying out in summer. It lies within an endorreic basin of 153 km²

Within the lake, there are various elements forming hummocks, of varying shapes and sizes, including the groynes that are used by nesting pink flamingos (*phoenicopterus ruber roseus*); the area, thus, is ecologically valuable and has been declared a Nature Reserve. This category represents the highest level of protection in Spain against transformation or alteration.



Aerial photography of the Fuente de Piedra wetland showing the salt deposits due to evaporation