

PRELIMINARY NOTE ON THE PALEOMAGNETIC REVERSAL RECORD OBTAINED FROM TWO MALLORCAN CAVES

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RESUMEN

Muestras de sedimentos obtenidas en dos cuevas mallorquinas con la ayuda del Speleo Club Mallorca, ponen de manifiesto una inversión del campo magnético terrestre en puntos sincrónicos de ambos depósitos (alrededor de un metro de profundidad). Esta inversión es la primera que ha sido observada en sedimentos de cueva, pareciendo corresponder al período "Mungo" que finalizó hace unos 32.000 años. Previamente, el "Mungo" solamente había sido identificado en sedimentos lacustres de Australia y en sedimentos marinos profundos del Golfo de Méjico.

Sediment samples obtained from two Mallorcan caves with the help of the Speleo Club Mallorca show a reversal of the earth's magnetic field at synchronous points in the two deposits, circa 1 m (Fig. 1). This reversal is the first ever observed in cave sediments and is thought to be the Mungo event which ended about 32.000 B.P. Previously, the Mungo event had only identified in lake sediments from Australia and deepsea sediments from the Gulf of México (Freed and Healy 1974).

Continuous sediment samples were taken from the surface to a depth of 2,7 m at Cova de Sa Campana (Sa Calobra, Mallorca), and from the surface to 1,8 m at the Cova de Canet (Esporlès, Mallorca). The records of paleomagnetic declination, inclination and intensity were then obtained for both caves at the University of Edinburgh, United Kingdom, with a Digico fluxgate magnetometer. The curves of declination and intensity together with the stratigraphic sections of the caves are shown in Figure 1. It can be seen that the reversal begins in both caves at close to 1 m and continues through to the bottom of the section at Canet (1,8 m) and to about 2 m at Campana. A sample of travertine from Canet is now being dated isotopically ($^{230}\text{Th}/^{234}\text{U}$) to test our interpretation of the age of the reversal.

While the paleomagnetic testing of these two caves was done primarily to help reconstruct the behavior of the earth's magnetic field in the past, the results obtained should be very useful in dating other Mallorcan caves as well as caves in other parts of Europe. When the age of the reversal is exactly known the points at the beginning and ending of the reversal can be used to date other cave sediments which contain similar evidence in their paleomagnetic logs. Paleomagnetic dating of cave sediments is much less expensive, faster and more convenient than most other methods, such as radiocarbon. It can sometimes be used in cave sediments that contain no record of a reversal by matching the curves of inclination and declination with a reference curve (Creer and Kopper 1974). The record of geomagnetic reversals for the past 2 million years is shown in Figure 2.

BIBLIOGRAPHY

- CREER K. M., and KOPPER J. S. (1974): "Paleomagnetic dating of cave paintings in Tito Bustillo Cave, Asturias, Spain". *Science* 186: 348-350
- FREED W. K. and HEALY N. (1974): "Excursions of the Pleistocene geomagnetic field recovered in Gulf of México sediments". *Earth and Planetary Science Letters*. 24: 99-104

COVA DE CANET

COVA DE SA CAMPANA

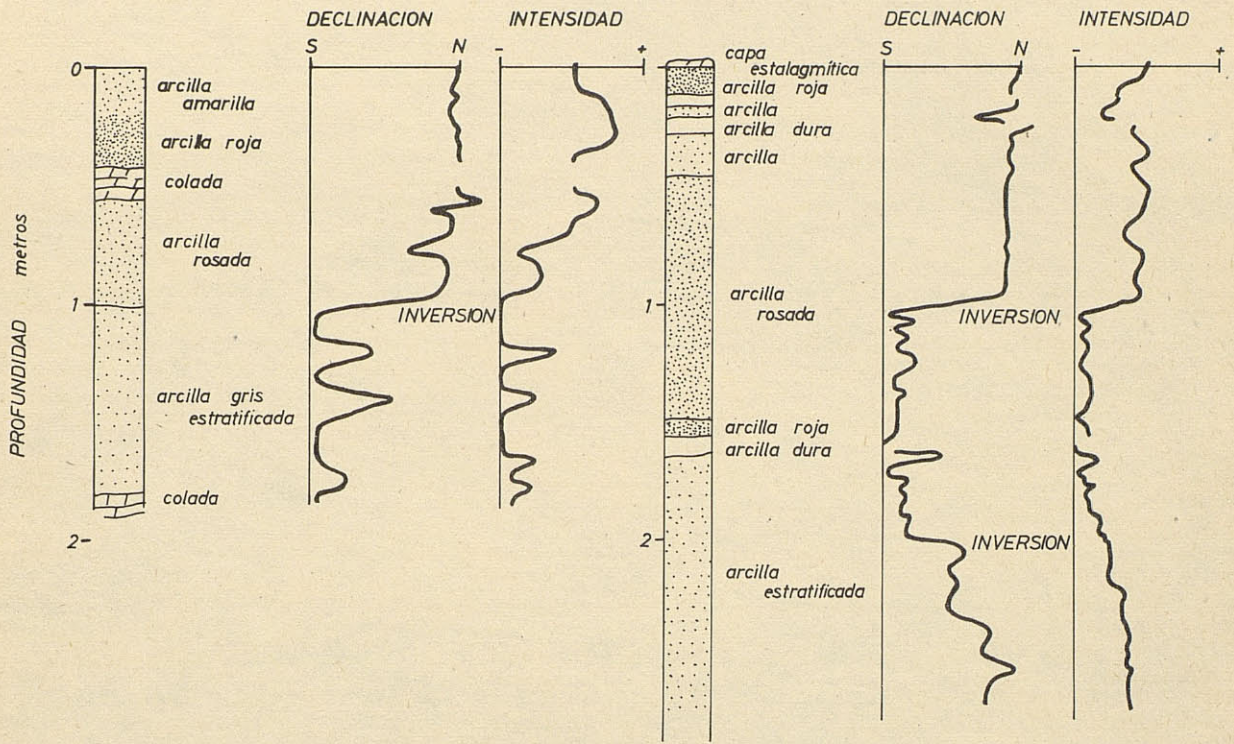


Figure 1

earth's magnetic field history

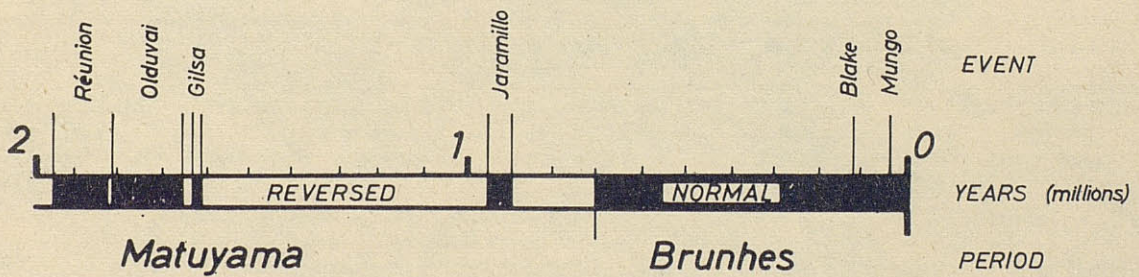


Figure 2