V CONGRESO DEL CRETÁCICO DE ESPAÑA

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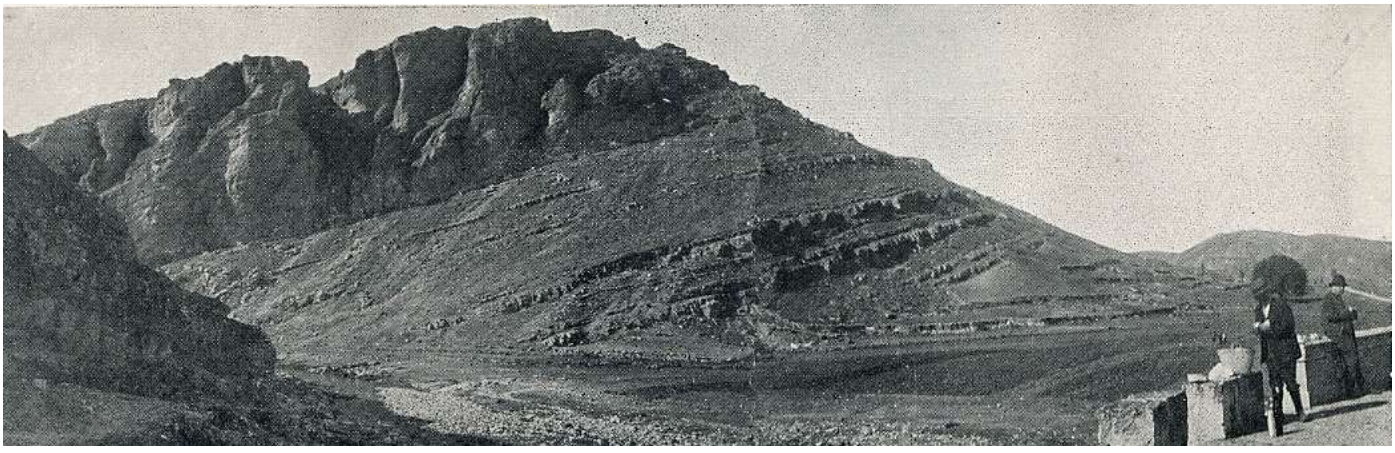

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CONTROLS ON DOLOMITISATION OF CENOMANIAN NERITIC CARBONATES OF THE CENTRAL IBERIAN BASIN, SPAIN.

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Cenomanian neritic carbonates of the Iberian Basin in Spain have been differentially dolomitised, with pervasive dolomitisation in the southernmost part of the basin, and a progressive decrease in dolomitisation to the north. Upon face value it appears that dolomitisation took place via a simple reflux mechanism. However, further observations suggest there are multiple mechanisms of dolomitisation and a tectonic control on the fluid flux of dolomitising fluids.

During the Cenomanian, the Iberian Peninsula was an intracontinental, shallow-water platform that was bounded to the east and west by the Ebro and Hesperian Massifs respectively, and partly exposed in the central part of the peninsula. The Santa Maria de Los Hoyas Formation (mid-Cenomanian) represents initial flooding of the underlying fluvial to marginal marine Utrillas sandstones. This unit is highly bioturbated with common oysters, echinoids and rare coral fragments. Further to the west, the formation becomes rich in clastic material, sourced from the Hesperian Massif. This is sharply overlain by the Villa de Ves Formation, a sequence of meter-scale, shallowing-upward peritidal cycles, capped by microbial laminites and pervasively dolomitised. Petrographic analysis of samples from the Villa de Ves Formation show planar, finely crystalline, non-luminescent to dull red luminescence suggesting that dolomitisation took place via oxidised to slightly reduced fluids at low temperature (<50°C). Isotopic analysis of dolomite shows enriched oxygen isotope signatures (-1.1 to -4.1‰ δ18O PDB) and depleted carbon isotope (0.2 to -2 ‰ δ13C PDB) with respect to penecontemporaneous seawater. Given the close association to algal mats, this suggests that dolomitisation occurred from mesohaline fluids and was in part mediated by microbial processes. Movement of refluxing brines was from north to south as a result of the SE dipping southern platform margin.

The bi-polarity of the Iberian platform allowed transgressions from the Tethys to the SE and Atlantic to the NW during the upper-Cenomanian causing flooding of the entire platform and open communication between the two oceans. Continued transgression during the upper-Cenomanian caused deposition of the mid-ramp Picofrentes Formation. This is composed of nodular limestones with abundant echinoids, oysters and ammonites dated as upper Cenomanian. The Picofrentes Formation is partially dolomitised, in the SE part of the study area, with dolomite showing planar textures with dull red-orange, sharp zonation. Distribution and fabrics suggest that dolomitisation occurred at low temperatures (<50°C). Isotopic analysis of dolomite exhibits enriched oxygen isotope signatures compared to coeval limestones typically between -2 to -4‰ δ18O PDB and normal marine carbon isotope signatures (2 to 4‰ δ13C PDB), suggesting dolomitisation took place via slightly evaporated seawater.

Tilting of the Iberian microplate to the NW as a result of the opening of the Bay of Biscay during the upper part of the middle to upper-Cenomanian caused emergence of the platform in the SE Betic range and rapid subsidence to the NW in the Basque-Cantabrian basin. This changed the configuration of the Iberian platform from bi-polarity to a NW titled platform. As a result, refluxing brines responsible for dolomitisation in the Picofrentes Formation moved from south-north, a reversal of direction to that seen within the older Villa de Ves Formation.

CON LA COLABORACIÓN DE: