



## **Characteristics, distribution and origin of Cretaceous dolostones from the western Maestrat Basin (E Iberian Chain)**

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Maestrat Basin suffered a wide hydrothermal event during the Late Cretaceous that led to several fault-controlled hydrothermal dolostone bodies. This study investigates for the first time the dolostone bodies outcropping in the Galve Sub-basin (western Maestrat Basin, eastern Iberia) with the purpose of understanding their origins and controls. For this, mapping of the dolostone bodies was made, drone imagery of outcrops was captured, 59 samples of dolostone and limestones were taken and 509 fractures were measured. Collected samples were used for petrological (optical, cathodoluminescence and electronic microscopes) and stable isotopes ( $\delta^{18}\text{O}$  and  $\delta^{13}\text{C}$ ) analysis. Dolomitization was controlled mainly by fault and fracture systems and depositional heterogeneities (differences on porosity and permeability), which resulted in several stratabound dolostones attached to subseismic-scale faults. Four main diagenetic stages were inferred: 1) an early shallow burial cementation (CC1); 2) an intermediate burial penetrative dolomitization, with two different but continuous replacement events (RD1 and RD2) and a dolomitic cementation (DC1 and SD1), followed by 3) a burial calcite cementation; and 4) a late meteoric calcite cementation and calcitization during uplift, related to Alpine Orogeny and/or Neogene extension. This led, respectively, to an increase and then decrease of porosity and permeability and thus, variations in reservoir properties. Further studies are required to understand and connect the dolomitization with basinal processes of the time.

*Key words:* fault-controlled, hydrothermal, dolostones