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High-resolution C and O stable isotope geochemistry of the early Aptian OAE1a at Cau (Prebetic Zone, Spain): Preliminary results from sediment core.

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The occurrence of time intervals of enhanced deposition of organic matter (OM) during the Cretaceous, defined as Oceanic Anoxic Events (OAE), reflect abrupt changes in global carbon cycling. The Aptian OAE1a (120 Ma), represents an excellent example, recorded in all the main ocean basins, associated to massive burial of organic matter in marine sediments [1]. Much research has been done on the OAE1a from different sections in the world over the last decades, including the definition of the C-isotope stratigraphy of the event [2]. Notwithstanding, higher-resolution studies across the entire event will be crucial to shed light into the precise timing and rates of the different environmental and biotic changes that occurred.

The Cau section is located in the easternmost part of the Prebetic Zone (Betic Cordillera), which represents the platform deposits of the Southern Iberian palaeomargin. The Lower Aptian of the Cau section is represented by a hemipelagic unit (Almadich Formation, ca. 200 m thick), deposited in a highly subsiding sector of a tilted block, located in the distal parts of the Prebetic Platform. Previous studies of the Lower Aptian of the Cau section have focused on the stratigraphy, bioevents, C-isotope stratigraphy, and organic and elemental geochemistry [3], [4], and in the reconstruction of pCO_2 from organic geochemistry proxies [5]. All these studies reveal that the Cau section represents an excellent site to investigate the OAE 1a, based on its unusual high thickness and stratigraphic continuity, the quality and preservation of fossils and the geochemical signatures.

Here we present the first results of a high-resolution carbonate C-isotope study based on the the analysis of three new research cores drilled at Cau in autumn 2015 [6]. These new data represent an important advance in the knowledge of the C-isotope record of the OAE 1a, presenting a more continuous record at a higher resolution than previous studies. This leads to the refining of the correlation with previously defined and worldwide recognized C-isotope segments of Menegatti et al. [2].
Along with the C-isotope stratigraphy, correlated with previous biostratigraphic and geochemical data from outcrop studies, profiles of magnetic susceptibility data (measured from the core in the laboratory) and geophysical log profiles measured down-hole, are presented. Preliminary sedimentological analyses of the core have been completed, with a focus on lithology and sedimentary structures, including ichnofacies of bioturbated levels. The facies association is dominated by dark marlstones, displaying a cyclic vertical organization.

These results confirm and refine previous data, and will be the base for ongoing analytical studies at a high-resolution scale, covering geochemical, biostratigraphic, sedimentological, ichnological and cyclostratigraphic analyses of the core.

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