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The Aalenian – Bajocian boundary was logged for the first time at the Murtinheira (Bajocian GSSP) and the Serra da Boa Viagem II sections, located in the Lusitanian Basin (West Central Portugal) using a portable gamma ray spectrometer, and well calibrated with the ammonite-based biostratigraphical zonation. These two coeval outcrops are represented by a prograding succession of greyish marl and limestone alternations, corresponding to the distal part of a carbonate ramp, which provides rich and diversified fossil (ammonoids, brachiopods) and microfossil (benthic foraminifera, calcareous nannoplancton) record.
Different bioevents have been already described for the Concavum Zone (upper Aalenian) - Discites Zone (lower Bajocian) transition in both sections, namely among the ammonites, brachiopods, calcareous nannofossils and especially among the benthic foraminiferal assemblages, which record a remarkable decrease on abundance and diversity, also detected in other coeval sections of different basins located at the northern hemisphere.
The gamma-ray data across these sections shows generally low values and variability, 13 to 60 API at Murtinheira section, and 26 to 59 API at Serra da Boa Viagem II section, which are typical of these carbonate hemipelagic facies. Moreover, the Th/U ratio is generally higher than 2 throughout the two sections suggesting well-oxygenated environmental conditions (also documented by the composition of the foraminiferal assemblages), which would have prevented significant organic matter accumulation; some levels displaying low Th/U ratio may reflect depletion in thorium (typical of many marine carbonates) rather than an increase in authigenic uranium, that usually is lower than 1 ppm.
Before and after the faunal impoverishment bioevent of Late Concavum – Early Discites Biochron, the K%, Th (ppm) and Th/U ratio at the two sections display a relative increase, probably related to an increment in the detrital supply, and therefore nutrient supply, which has enabled the faunal recovery, as well as the raise of deep infaunal foraminifers recorded at the latest part of the Discites Biochron. This could be related to the increase of calcareous nannofossil fluxes that coincide with a positive shift in carbon isotope compositions of bulk carbonate in the earliest Bajocian reported by some authors for the Murtinheira and other Iberian sections.
In basin analysis of carbonate platforms the integration of major biotic turnovers and gamma-ray spectrometry data can be a useful tool in the improvement of correlation between wells and outcrops. Moreover, they assist in the interpretation of depositional environment and paleoclimatic constrains assigned to a basin.