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TITULO DE LA PONENCIA

Lithostratigraphy and geochemical characterization of the Simijaca-La Frontera formations (Cenomanian-Turonian) in Colombian Eastern Cordillera in relation to oceanic anoxic event 2 (OAE 2).

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Estilo preferido

ESTILO DE PRESENTACIÓN

- Poster

Categoría del resumen

ÁREA TEMÁTICA

Bio - Geo - Química

LÍNEAS TEMÁTICAS BGQ

Petrología, mineralogía y geoquímica

Resumen

PALABRAS CLAVE

Cenomanian-Turonian transition, Eastern Cordillera, Zipaquirá, Geochemistry, Oceanic anoxic Event 2, carbon stable isotopes, geochemistry

CONTENIDO DEL RESUMEN

The Cenomanian-Turonian (C/T) transition is associated with oceanic deoxygenation that impacted marine life and the global carbon cycle (Schlanger et al., 1987; Joo et al., 2020). In Colombia, the C/T interval has been of interest for stratigraphic correlations among different basins (e.g., the Magdalena Valley, Eastern Cordillera, and Llanos Basins) (Villamil and Arango, 1998; Mahoney, 2018). The driving factors that contributed to organic matter accumulation, facies changes, biological and geochemical shifts during this interval are fairly known. A

stratigraphic section Zipaquirá, Colombia, permits to further elucidate the paleoenvironmental conditions in the basin at that time. We present multi-proxy preliminary results, including petrographic analysis, TOC, TIC, δ13Corg, major and minor elements of the stratigraphic section in Zipaquirá that provide paleoenvironmental characteristics of the Simijaca (Cenomanian) and the La Frontera (Turonian) Formations.
At the field scale the Simijaca Formation includes dark gray (N3) mudstones and claystones with flaser bedding, and grayish yellow green (5GY 7/2) very fine-grained sandstones. The La Frontera Formation comprises interbedded grayish black (N2) to medium dark gray (N4) shales with phosphatic components, plant fragments, calcareous mudstones and marlstones with ammonoids, inoceramid impressions, and limestones with calcareous concretions. Three volcanic beds occur in this unit.
Petrographic analyses reveal that the Simijaca Formation displays pseudo-laminated structures composed of micro-spherules but is lacking identifiable microfossils. By contrast, the La Frontera Formation includes planktonic foraminifera, coccolithophores, and radiolarians. The volcanic layers are composed of feldspar, micas, and volcanic glass.
There is a moderate positive correlation between TOC and TIC (R2=0.41). The lowest TOC (<0.17 C wt%) and TIC (<0.12 CaCO3 wt%) values are related to the Simijaca Formation, whereas the La Frontera Formation reaches maximum TOC of 6.79 wt % and 70.8 CaCO3 wt %. Major elements Si (12.5 – 40.2 wt %), Al (0.4 – 9.4 wt %), Ti (0.03 - 0.61 wt%), Fe (1.2 – 10 wt %) and P (0.1-2.1 wt%) vary throughout the two formations. δ13Corg shows a moderate correlation with TOC and TIC (TOC, R2=0.35; TIC, R2=0.38). A positive shift of 2.61‰ occurs in the La Frontera Formation at 114 m. The fossil assemblages and lithologic changes suggest a shift from predominately siliciclastics in the Simijaca to hemipelagic deposits with increased productivity associated with upwelling in the La Frontera Formation. Enhanced accumulation of organic matter and the positive shift of δ13Corg during the La Frontera sediments deposition suggest oxygen-deficient conditions that correlate with ocean anoxic event 2 (OAE2)

REFERENCIAS BIBLIOGRÁFICAS

Joo, Y. J., Sageman, B. B., & Hurtgen, M. T. (2020). Data-model comparison reveals key environmental changes leading to Cenomanian-Turonian Oceanic Anoxic Event 2. Earth-Science Reviews, 203, 103123.

Mahoney, C. A. (2018). Inorganic geochemical characterization of the Cretaceous source rocks of the Eastern Cordillera, Colombia. Doctoral dissertation, Newcastle University.

Schlanger, S. O., Arthur, M. A., Jenkyns, H. C., & Scholle, P. A. (1987). The Cenomanian-Turonian Oceanic Anoxic Event, I. Stratigraphy and distribution of organic carbon-rich beds and the marine δ13C excursion. Geological Society, London, Special Publications, 26(1), 371-399.

Villamil, T., & Arango, C. (1998). Integrated stratigraphy of latest Cenomanian and early Turonian facies of Colombia.