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Vanessa R Kertzhus, Eglee Zapata, and Victor Padron, Universidad Central de Venezuela, Caracas, Venezuela

Anoxia Versus Productivity and Its Effects on Paleoecology: A Case of Study of the La Luna Formation Black Shales in the Venezuelan Andes

The occurrence of organic-rich sediments in western Venezuela, involved a complex relationship between the paleo-bathymetry, paleoecology and paleoceanography, evidenced on the stratigraphic record by the faunal behavior, sedimentological and geochemical features. This paper aims at the evolution of the diverse conditions that allowed the input and preservation of organic matter, and its connection with productivity, oxygen depletion, and oceanic circulation during the deposition of the La Luna Formation in the Venezuelan Andes.

The establishment of appropriate conditions for the preservation of organic-rich sediments, seemed to be controlled at great scale by eustatic changes and major oceanic circulation, while small scale, could be controlled by bottom waters oxygen-level variations originated by local conditions. Four paleoecologic correlation intervals can be established: The first spans from late Cenomanian to early Coniacian, it represents a highstand-system-tract characterized by the shift from the final phase of anoxic and oligotrophic conditions associated to the OAE2, to eutrophic water masses experiencing anoxia-dysoxia fluctuations. The second, spans from mid Coniacian to early-mid Santonian, during this period a transgressive event developed the most anoxic conditions within the basin evolution associated to the OAE3. Hence forth, an important change in the paleoceanographic setting developed unstable and eutrophic conditions in the water column, creating anoxic-dysoxic and oligotrophic-eutophic fluctuations under a highstand-system-tract. These pulses became more recurrent by the late Santonian – early Campanian, where the fourth interval begins with more oxygenated conditions and a new transgressive-system-tract, leading to the drowning of the platform and closing the deposition of the La Luna Formation.