

## **Isotopic Composition of Diagenetic Products of Carotenoids in Lower Cretaceous Lacustrine Source Rocks, West African Rift Basins**

By

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Understanding whether high primary productivity or enhanced preservation in anoxic conditions is the main control on the accumulation of sedimentary organic matter (OM) is crucial for petroleum exploration. Previous work indicates that changes in primary productivity controlled OM preservation in the Lower Cretaceous lacustrine source rocks in the Congo basin. The initial investigation of OM accumulation in the Kwanza basin and the Atlantic basin of Gabon showed that anoxia could have played the dominant role. The purpose of this research is to provide a better understanding of the role of anoxia in Angola and Gabon. We intend to do this by determining the sources of diagenetic products of carotenoids in paleo-lacustrine samples.

The project involves a combination of sedimentological, geochemical, and compound-specific isotopic analyses. The data from these analyses will be used for the development of paleoenvironmental models for accumulation of lacustrine source rocks under different depositional conditions. In addition, we will culture several species of brown strains of green sulfur bacteria. Culturing experiments will help us obtain isotopic data from the total biomass and specific biomarkers.

The paleo-lacustrine data will be obtained using a suite of cores from Lower Cretaceous sections in West Africa. The extensive coverage and high OM content of shales provide a unique opportunity to conduct high-resolution analyses at different stratigraphic intervals. We will analyze sedimentary properties, use pyrolytic methods, and investigate quantitative and compound-specific isotopic composition of biomarkers. Cultured biomass and biomarkers will be subjected to high-performance liquid chromatography, pyrolytic and compound-specific isotope analyses.