Chemicals and Chemistry; Findings from University of Texas Austin in Chemicals and Chemistry Reported (Sedimentary Environment and Benthic Oxygenation History of the Upper Cretaceous Austin Chalk Group, South Texas: an Integrated Ichnological, Sedimentological and ...)

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2024 FEB 6 (NewsRx) -- By a News Reporter-Staff News Editor at Life Science Weekly -- Investigators discuss new findings in Chemicals and Chemistry. According to news originating from Austin, Texas, by NewsRx correspondents, research stated, "Oxygen concentration in the ocean is vital for sustaining marine ecosystems. While the potential impacts of deoxygenation on modern oceans are hard to predict, lessons can be learned from better characterizing past geological intervals formed under a greenhouse climate."

Funders for this research include Carbonate Reservoir Characterization Research Laboratory at the **Bureau of Economic Geology**, JSG analytical grant, Carbonate Reservoir Characterization Research Laboratory (RCRL), State of Texas Advanced Oil and Gas Resource Recovery (STARR) projects at the **Bureau of Economic Geology**, Center for Planetary System Habitability (CPSH) at the University of Texas at Austin, Gulf Coast Carbon Center (GCCC) project at the **Bureau of Economic Geology**, Robert K. Goldhammer Endowment, Natural Sciences and Engineering Research Council of Canada (NSERC), George J. McLeod Enhancement Chair in Geology.

Our news journalists obtained a quote from the research from the University of Texas Austin, "The greenhouse Cretaceous containing several oceanic anoxic events characterized by widespread oxygen-deficient water is ideal in this regard. The Austin Chalk Group in south Texas (USA) shows organic-rich intervals that can be linked to oxygen depletion in the ocean, but the exact bottom water oxygenation conditions have not been estimated. This study aims to reconstruct both sediment interstitial and bottom water oxygenation history during Austin Chalk Group deposition by integrating detailed ichnological, sedimentological and geochemical (X-ray fluorescence and X-ray diffraction) analyses, thereby providing a consistent model that may be applicable across a range of marine shelf settings. The 141.12 m Gise #1 core contains a continuous record of the Austin Chalk Group, providing an opportunity for unravelling oxygenation and deoxygenation events. Whereas the anaerobic-exaerobic deposits are essentially nonbioturbated, four oxygen-related ichnocoenoses are defined, further refining the transition of aerobic to dysaerobic conditions in the sediment interstitial water. Omission surfaces and glauconitic grains, products of current-induced scouring and condensation, suggest sporadic high-energy events in the Austin Chalk Group ramp that drove elevated terrestrial inputs. Geochemical data further help to identify anoxic bottom water conditions within the anaerobic facies. Additionally, the lowermost part of the Austin Chalk Group illustrates redox cycles, whereas dilution events characterized by elevated terrestrial input are identified throughout the rest of the Austin Chalk Group. The evolution of oxygenation levels in sediment interstitial water and bottom water disputes the existence of a long-lasting oxygen-deficient sea in south Texas. The refined depositional model may be applicable to coeval shelfal settings."

According to the news editors, the research concluded: "Moreover, the results provide insights into variable, evolving palaeoclimatic and palaeoceanographic conditions of the greenhouse Late Cretaceous."

This research has been peer-reviewed.

For more information on this research see: Sedimentary Environment and Benthic Oxygenation History of the Upper Cretaceous Austin Chalk Group, South Texas: an Integrated Ichnological, Sedimentological and Geochemical Approach. Sedimentology, 2024. Sedimentology can be contacted at: Wiley, 111 River St, Hoboken 07030-5774, NJ, USA. (Wiley-Blackwell - www.wiley.com/; Sedimentology - onlinelibrary.wiley.com/journal/10.1111/(ISSN)1365-3091)

The news correspondents report that additional information may be obtained from Charlie Y. C. Zheng, University of Texas Austin, Jackson School of Geosciences, Dept. of Geological Sciences, 2305 Speedway Stop C1160, Austin, TX 78712, United States. Additional authors for this research include Charles Kerans, Lucy T. Ko, Luis A. Buatois and M. Gabriela Mangano.

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