Chemostratigraphy and Oceanic Anoxic Event of the Cenomanian-Turonian Succession, West Sinai Peninsula, Egypt

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Cretaceous rocks are considered the main oil-bearing units in most oilfields of the northern Western Desert of Egypt and some fields in the Gulf of Suez region. The Raha and Abu Qada Formations (Cenomanian-Turonian) are composed of five third-order depositional sequences, three of which are observed in the Raha Formation, with the other two recorded in the Abu Qada Formation. Sinai Peninsula was tectonically stable during the Cenomanian and middle-late Turonian, so changes in relative sea level played a major role in lateral and vertical distribution of facies. There is a good relationship between sea level fall and increasing of SiO_2, Al_2O_3, Fe_2O_3, and MgO concentrations in the studied carbonates. The SiO_2, Al_2O_3, Fe_2O_3, and MgO contents increase landward in highstand systems tract deposits, especially in shallow lagoonal carbonates. On the other hand, there is a good relationship between rising sea level and increasing of CaO and Sr contents in the studied carbonates. The CaO and Sr concentrations increase basinward, in transgressive systems tract and flooding events. The increasing content of CaO and Sr basinward is an indication of a little effect of dolomitization in outer ramp carbonates and suitable conditions for carbonate factory while in the shallow lagoon; the siliciclastics hinder the carbonate formation.

The Cenomanian-Turonian boundary event is known as the largest oceanic anoxic event during the Cretaceous. This global event has been documented in five of the studied sections. The lithology of this horizon is composed mainly of argillaceous limestone and shale containing planktonic foraminifera, calcispheres and ammonites. The observed $\delta^{13}C$ excursions vary between +2.67 ‰ and +5.25 ‰. These high positive excursions in $\delta^{13}C$ are associated with highly negative values of $\delta^{18}O$ (values range from -6.01 ‰ to -1.38 ‰). Excess burial of organic carbon in global anoxic oceans resulted in prominent positive $\delta^{13}C$ excursions in marine carbon records across the Cenomanian-Turonian interval.