Aptian Halites Of The Sergipe Basin, Northeast Brazil: Implications For SeaWater Chemical Composition Through Fluid Inclusion Analyses

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Aptian evaporites form a remarkable stratigraphic section on the eastern continental margin of Brazil. The 1km or more thick sequence separates the lower continental rift sequence from the typical marine upper sequence. Work on the nature of the Aptian evaporites has proposed a Persian Gulf sabkha type model for the facies associations observed in Sergipe. However, the proportion of minerals in the Sergipe evaporites, with small amounts of sulfate, abundant halite, carnalite, sylvinite and tachyhydryte, is distinct from the predicted mineral series formed from modern seawater evaporation, which suggests a different parent brine composition for these evaporites.

Fluid inclusions analysed in halites from Sergipe indicate a parent brine composition rich in calcium and sulfate-poor, different from the modern ocean. Similar analyses carried on other evaporite deposits of same age in Congo and of late Cretaceous age in Thailand came out with results equal to the Sergipe evaporites. Such results suggest that the chemical composition of seawater in the Cretaceous was different from today's ocean, presenting higher calcium and lower sulfate values. These results explain the thin layers of anhydrite and the abundance of Ca-rich salts in Sergipe.