A NEW HALOGENETIC MODEL FOR THE MIOCENE "SALINITY CRISES" OF THE EASTERN CENTRAL PARATETHYS AND MEDITERRANEAN BASINS

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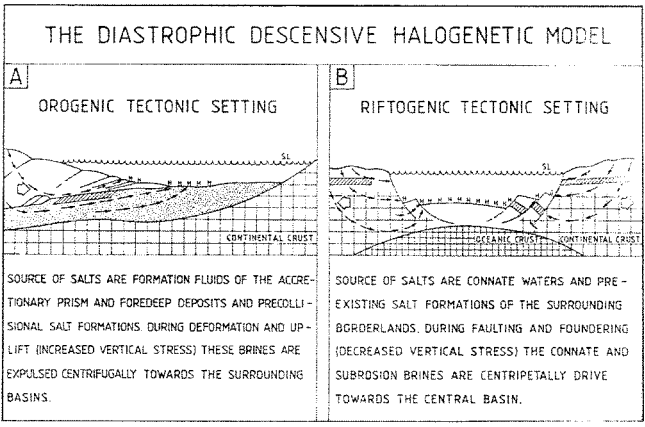
Thick Miocene salt formations are known from two areas of Europe mainly : from the eastern Central Paratethys Basins of the Carpathian region and the West and East Mediterranean Basins of the relict Neotethys. The first are of Lower to early Middle Miocene (Late Egerian- Eggenburgian, Karpatian and Middle Badenian) age, the second - of Upper Miocene (Messinian) age. The first occur in foredeep and back arc structural basins of the Carpathian thrust belt and are syn-collisional deposits, the second occur in deeply foundered extensional basins between the circum-Mediterranean Alpine thrust-belt chain and are mainly early post-collisional deposits. For both an evaporitic origin was and is up to now postulated, i.e. it is assumed that their deposition was climatically controlled. For the first a marine shallow water shallow basin to sebkha depositional model is mainly accepted, for the second, a dessicated marine shallow water deep basin depositional model proposed by HSU *et al.* (1973) is still accepted . In both cases the accepted evaporative genetic model and the proposed depositional models needs revision.

For the time of Lower and Middle Miocene salt deposition within the eastern Central Paratethys Basins of the Carpathian region paleobotanic, both macro- and micro- floral, and paleozoological data suggest a warm and humid, sometimes even wet Cfa, occasionally Cw *(sensu* Koppenen) climate, with precipitations exceeding evaporation; this excludes the possibility of extensive evaporitic salt deposition (LISZKOWSKI, 1989). The author also documented that the geologic setting, facies associations and internal fabric of the salt formations point for deep water depositional environment and that their lithofacies distribution, mineralogy and geochemical composition are in many respect quite unusual and do not fill the rules of the evaporitive genetic model. A new orogenic descensive halogenetic model was proposed for the salt formations discussed (LISZKOWSKI, 1989).

For the time of Upper Miocene (Messinian) salt deposition within the West and East Mediterranean Basins only in latest time GREGOR (1990) documented on the basis of both intensive and extensive analyses of macrofloral assemblages from many Miocene localities all around the European hinterland that : (1) no changes in floral composition in pre-, syn-, and post-Messiniam times occured, (2) there are no signs of arid or dry phases in the floras, meaning lack of "steppic", savanna - type or Mediterranean - type elements, and (3) the climate in Messinian time was wet, probably a certain Cw-climate (dry winter, wet summer), markedly different from the Recent Cs-climate of the Mediterranean area. He concluded, that the Messinian Salinity Crisis need another explanation.

The following genetic model for the Messinian salt formation of the Mediterranean Basins is proposed : as the result of the strong and rapid, collapse-like subsidence (foundering) of the basins and the rising thrust-belts surrounding them, a strong topographic and pressure gradient developed directed towards them. They acted as large-scale wells or sinks for groundwater flow. The drained groundwaters were very probably highly mineralized saline formation waters and brines with salinities up to 350 kg m^{-3} and more and mostly of the Cl-Na hydrogeochemical type. These dense and warm subsurface brines accumulate at the bottom of he basins. Precipitation of halite starts as the result of cooling and progressively continued in time. The salt precipitated start as deep-water deposits and only at the final stages the depositional environment probably changed into an shallow water one. No dessication of the Mediterranean basins occured. Simple mass bilance calculations for a wide range of realistic values of drawdown, hydraulic gradients, rock permabilities and groundwater salinities confirm the proposed model.

The proposed genetic model of Messinian salt deposition within the Mediterranean Basins as well as the postulated orogenic descensive halogenetic model for the Miocene salt formations of the Carpathian Paratethys Basins stress the active role of the tectonic and somewhat drop the importance of the climatic factor for giant salt deposition. Both models are end members of a more general diastrophic descensive halogenetic model (Figure). But they do not imply that the classic evaporative model is incorrect !



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