

Evaporitic minibasins of the Sivas Basin (Turkey)

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The Oligo-Miocene Sivas basin (Turkey) was strongly affected by salt tectonics, best expressed in its central part. Halokinesis initiated from a main evaporite layer deposited during the Upper Eocene. Such evaporitic accumulations led to two generations of mini basins filled with continental to marine deposits, and nowadays separated by diapiric gypsum walls or welds.

Some mini-basins developed above depleting diapirs, filled by more than 50 % of lacustrine to sebkhaic gypsiferous facies. These evaporitic mini-basins (EMB) developed during periods of limited fluvial input, when diapiric stems were outcropping with insignificant topographic reliefs. Chemical analyses (S, O and Sr) suggest that such evaporites were sourced from the recycling of adjacent salt structures.

EMB development above diapirs can be explained by (i) high regional accommodation (Ribes et al., 2016), (ii) erosion of the diapiric crests by the fluvial system preceding evaporite deposition, (iii) deflation of some diapirs in a transtensive setting (Kergaravat, 2015), and (iv) fast sedimentation rate of the evaporites.

EMB stand out from other siliciclastic mini-basins of the Sivas Basin by (i) their small dimension (< 1km), (ii) their teardrop encased shape and (iii) exacerbated internal halokinetic deformations. The latter specifically include large halokinetic wedges, mega-slumps or inverted mega-flaps. Comparison with siliciclastic mini-basins suggests that strong halokinesis of EMB was triggered by the ductile rheology of their evaporitic infilling.

Additional filling and subsequent withdrawal of EMB may have been also increased by (i) the large amount of solutes provided by leaching of the outcropping diapiric structure together with the fast sedimentation rate of the evaporites and (iii) the high density of the gypsum and anhydrite compared to halite.

The Great Kavir in Iran could display present day analogues relevant of early-stage EMB. Finally, although EMB have never been identified in other ancient halokinetic settings, they may have developed in arid, continental environments such as in the Precaspian Basin.