Geophysical Research Abstracts
Vol. 17, EGU2015-9091, 2015
EGU General Assembly 2015

Deposition and evolution of the Sivas basin evaporites (Turkey)

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The Oligo-Miocene Sivas basin (Turkey) is strongly affected by salt tectonics, best expressed in its central part. Halokinesis initiated from the Upper Eocene Hafik formation, composed of thick evaporite layers. Salt tectonics induced the formation of numerous mini basins filled with continental to marine deposits, and nowadays separated by diapiric gypsum walls or welds.

Continental deposits filling minibasins developed in arid conditions. Minibasin sandstones are frequently interlayered with evaporitic deposits (gypsum and anhydrite). Two types of depositional evaporites can be distinguished: (i) evaporites precipitated in lacustrine to sebkhaic environment, (ii) gypsarenites resulting from clastic gypsum remobilization. Field observations suggest that both types of depositional evaporites were likely sourced from the recycling of adjacent salt structures.

Precipitation of lacustro-sebkhaic evaporites may have been triggered by meteoric waters enriched in dissolved sulfate after the chemical dissolution of outcropping evaporites. Gypsarenite deposits can be explained by mechanical dismantling of nearby evaporite structures.
Evaporitic deposits were subsequently involved in active salt tectonics. During periods of quiescent diapirism, thick sebkhaic deposits were also deposited in secondary minibasins located on former salt domes. During periods of diapiric growth, linked to regional compressive tectonics, these deposits were then locally deformed and can show strong flowage textures.

When rising diapiric evaporites reached the surface, it was also able to mechanically spread out within the minibasins, forming salt glaciers. In this case, if depositional evaporites were overlying the extruded diapir, both diapiric and depositional evaporites were incorporated in salt tectonic structures.

Ongoing chemical analysis should help us to precise more accurately the different sources and the dynamics of these multigeneration evaporites.