PO06

Salt Tectonics of the Sivas Basin (Turkey): Open-air Museum of Seismic Analogues

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SUMMARY

The Sivas Basin in Anatolia is likely the world's finest open-air museum of salt tectonic structures. It is an elongated Oligo-Miocene sag basin that developed in an orogenic context above the complex Taurus-Pontides suture. A mid Oligocene quiet period in an overall continuous convergence history allowed the deposition of a thick evaporite sequence. Erosion of the Taurides shed clastic sediments and initiated the development of mini-basins and associated evaporite diapirs and walls. The minibasins are filled by Mid-Oligocene to Early Miocene clastics (fluvial silts and sandstones), marls, and lacustrine to marine limestones, the thickness of which may reach 4 kilometres. The stratal architecture along evaporite walls records the progressive subsidence of the minibasins, with strong rotation of beds, unconformities and local reworking of evaporites. Within the basin, the sediments show lateral thickness variations and spectacular angular unconformities. Following this quiet period, compression resumed in Early Miocene, forcing evaporites upward, which led to the formation of overhangs and sheets.

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The Sivas outcrops allow to image the classic geometries associated to the development of diapirs, i.e. halokinetic sequences along diapir walls, and associated stratal deformation, welds and local surface emission of evaporite glaciers. The Sivas Basin also presents more exotic structures such as minibasins, mega flaps (thinned sedimentary sequences pinching out on top of diapirs and overturned during glaciers development) and evaporites sheets. Such structures are only observed in thick and highly deformed salt basins, and are known at outcrop only in the Axel Heiberg area (Northern Territories, Canada – hardly accessible) and the Flinders Ranges (Australia – not such a well-preserved system without poorer outcrop conditions). Striking geometric analogies between these outcrops and seismic images from the classic petroleum province controlled by salt tectonics arose, and will illustrate the extraordinary quality of the Sivas basin as field analogue for the Gulf of Mexico, Brazil, Angola, Congo and Red Sea Margins.