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Tectono-sedimentary evolution of salt controlled minibasin in a fold-an-thrust belt setting Example from the Sivas Basin Turkey and physical model.

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The aim of this study is to present the influence of regional shortening on the evolution of a minibasin province and the associated foldbelt geometry based on a natural example, the Sivas Basin, then compared to a physical experiment.

The Sivas Basin in the Central Anatolian Plateau (Turkey) is a foreland fold-and-thrust belt, displaying in the central part a typical wall and basin province characterized by spectacularly exposed minibasins, separated by continuous steep-flanked walls and diapirs over a large area (45x25 km). The advance of the orogenic wedge is expressed within the second generation of minibasins by a shortening-induced squeezing of diapirs. Network of walls and diapirs evolve form polygonal to linear pattern probably induced by the squeezing of pre-existing evaporite walls and diapirs, separating linear primary minibasins. From base to top of secondary minibasins, halokinetic structures seem to evolve from small-scale objects along diapir flanks, showing hook and wedges halokinetic sequences, to large stratigraphic wedging, megaflap and salt sheets. Minibasins show progressively more linear shape at right angle to the regional shortening and present angular unconformities along salt structures related to the rejuvenation of pre-existing salt diapirs and walls probably encouraged by the shortening tectonic regime. The advance of the fold-and-thrust belts during the minibasins emplacement is mainly expressed during the late stage of minibasins development by a complex polygonal network of small- and intermediate-scale tectonic objects: (1) squeezed evaporite walls and diapirs, sometimes thrusted forming oblique or vertical welds, (2) allochthonous evaporite sheets, (3) thrusts and strike-slip faults recording translation and rotation of minibasins about vertical axis. Some minibasins are also tilted, with up to vertical position, associated with both the salt expulsion during minibasins sinking, recorded by large stratigraphic wedge, and the late thrust faults developments. The influence of the regional shortening deformation seems to be effective when the majority of the evaporite is remobilized toward the foreland.

Results of scaled physical experiments, where continuous shortening is applied during minibasins emplacement, closely match with the deformation patterns observed in the Sivas minibasins. Shortening induce deformations such as translation of minibasins basinward, strike-slip fault zones along minibasin margin, rejuvenation of silicon walls and diapirs, emergence of silicon glaciers and rotation of minibasins along vertical and horizontal axis.