

MECHANISMS OF SALT DIAPIR FORMATIONS: SOME MODERN IDEAS AND THEIR COMPARISON WITH OBSERVATIONS

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Results of sandbox modelling, along with the interpretation of some observations in the field and on seismic lines, led many workers to ideas about the mechanisms of salt diapirism in sedimentary basins that relied strictly on the precepts of brittle deformation in salt overburden.

The Dniepr-Donets Basin (DDB) is the deepest basin of Europe and excellent natural laboratory on salt tectonics. Salt pillows, anticlines, and diapirs of different shapes are located in the basin. Periods of diapirism coincided with regional tectonic phases. At first sight, salt tectonics of the DDB confirms the ideas that gravity forces exerted a small influence on the formation of diapirs. However, it can be demonstrated that patterns of salt tectonics and various peculiarities of overburden deformation in the DDB contradict those that are compatible with “brittle” models of salt diapirism.

Observations to be documented and discussed in terms of diapiric mechanisms include: (1) concordance of salt pillows and anticlines formed during phases of regional extension with the sedimentary overburden; (2) the development of faults in the overburden a result of salt movements rather than vice versa; (3) the temporal development of salt pillows and anticlines in the absence of reactive piercement of salt diapirs; (4) the style of deformation in sediments older than halokinesis; (7) the relationship of salt structures with basement faults; (9) the role of erosion of the overburden relief caused by flowing of salt into salt structures as one of the most effective mechanisms in promoting salt piercement.