

FORWARD AND INVERSE MODELING OF THE 3 DIMENSIONAL RAYLEIGH-TAYLOR INSTABILITY AND SALT DIAPIRISM.

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We present analytical and numerical modeling of 3 dimensional Rayleigh-Taylor instability and salt diapirism. Techniques for both forward and inverse modeling are developed. We investigate the interplay between 2D (wall like) and 3D (finger/mushroom like) structures. We show that 3D structures may develop out of an initially 2D wall-like perturbation (i.e. faulted basement). Inverse modeling is capable to restore the initial geometry out of intensively deformed and overturned 3D diapiric structures. Furthermore we investigate the several geological processes conditioning the salt diapirism, such as slope of the basement, differential loading by wedging out overburden, erosion and deposition, depth dependent properties of the sedimentary column and horizontal tectonic loading.