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# Salt Tectonics above Complex Basement Extensional Fault Systems: Results from Analog Modeling

Physical models of salt tectonics related to thick-skinned extension are largely confined to 2D structures. An experimental program, utilising silicone polymer and silica sand/ceramic beads as ductile and brittle analogs respectively, was designed to investigate the 3D relationships between salt diapirs and intersecting basement fault systems seen in the Central Graben, UK North Sea.

During extension, intersection points in the basement fault system generate complex single, 2-way or 3-way, flap structures in the overburden, localizing cover deformation and footwall diapiric activity on the rift margins. Flap structures and associated diapirs are located adjacent to, but diagonally inboard of, the basement intersection points and consist of convex-to-the-hangingwall fault segments that are gradually breached with increasing extension. Major diapirs that attain passive status accommodate much of the continued basement extension through downbuilding. Intra-basin horst systems develop inwardly-dipping graben cored by a major salt wall during initial extension. Axial flow along this structure feeds growing diapirs. Grounding of the brittle overburden results in source cut-off and deflation of the salt wall due to continued expansion by extensional faulting.

During subsequent inversion major diapirs are reactivated, exhibiting rapid active rise through the overburden, suggesting that buoyancy forces associated with diapirs plays a major role in their reaction to subsequent tectonic stresses. Basin margins with major corner point systems develop highly segmented inversion fronts related to the localized nature of brittle structuring during extension. Diapir crests and entrained salt bodies are nucleation sites for the development of brittle reverse faults.