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Analogue Models of Complex Fault Traps in Extensional Terranes

Scaled sandbox models have been used to simulate the development of orthogonal and oblique rift systems where complex traps develop in fault overlaps, relay ramps and accommodation zones. Large 3D analogue models of rift fault systems were constructed in layered sandpacks and deformed under uniaxial stretching conditions. Orthogonal, oblique and offset models were run to simulate a variety of rift geometries. Time lapse photography was used to animate the progressive evolution of the models and serial sections of the models were cut in order to determine the internal geometries of the systems. Rift border fault systems formed parallel to the zone of basement stretching whereas intra-rift fault systems generally formed orthogonal to or at high angles to the extension direction. Most extensional faults evolved from highly segmented systems to linked systems forming relay ramp structures and kinked fault traces. Offset rift systems formed complex accommodation zones either sub-parallel to the extension direction or at an angle to the extension direction. The results of the analogue models are compared to extensional fault traps in the North Sea and elsewhere.