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Plate motion variations in rift-transform margin intersections; insights from an analogue modelling experimental approach.

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Transform margins are first order structural features that represent a total of 16% of the cumulative length of continental margins accommodating oceanic spreading. Yet, for transform margins, the evolution, genetic relation to oceanic spreading, and general structural character still present a challenging research field. In this work, we investigate the evolution of rift-transform intersections using an analogue modelling approach.
Through a series of experiments, we investigate the effect of an imposed variation in the rift extension direction, a component in rift-transform interaction that has not been studied previously. In the model we use a two layer ductile-brittle configuration to simulate the crustal rheology. We initiate rifting in an orthogonal direction and then proceed to shift the plate vector to a 7 degree angle derived from natural examples. Rifting then continues with the new plate motion vector. The experimental configuration we use allows the study of transpressional and transtensional rotation of the moving plate simultaneously. Preliminary results show that: a) a transtensional shift in the plate direction produces en-echelon oblique slip faults which accommodate the horizontal displacement until the new plate motion vector is stabilized and b) a transpressional shift produces buckle folding near the rift-transform intersection and widespread transpression further away from the rift.
We then compare our observations with seismic reflection images from a range of margins around the world, including the Gulf of California partitioned oblique margin, the W. Australia Southern Exmouth Plateau and Perth Transform Margins, and the Rovuma Transform Margin.