



Transpressive systems - 4D analogue modelling with X-ray computed tomography

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A series of 4D transpressional analogue models was analyzed with X-ray computed tomography (CT). A new modular sandbox with two base-plates was used to simulate strike-slip transpressional deformation and oblique basin inversion. The model itself is constructed on top of an assemblage made up of plexiglas- and foam-bars that enable strain distribution. Models consisted of a basal polydimethylsiloxane (PDMS) layer overlain by a quartz sand pack (Schreurs 1994; Schreurs & Colletta, 1998). The PDMS layer distributes the strike-slip shear component of deformation evenly over the entire model. The initial length of the model was 80 cm. The initial width of the model was 25 cm and was extended to maximal 27 cm to form graben structures. During extension a syn-sedimentary sequence of granular materials was added before transpression was started. Different ratios of shear strain rate and shortening strain rate were applied to investigate the influence on fault generation in both set-ups. To avoid side effects, our fault analysis focused on the central part of the model with a safety distance to the strike-slip orthogonal sidewalls of 20 cm.

At low-angle transpression, strike-slip faults form predominantly during initial stages of deformation. They merge in part with pre-existing graben structures and form an anastomosing major fault zone that strikes subparallel to the long dimension of the model. At high-angle transpression, thrusts striking parallel to the long dimension of the model dominate. Thrust localisation is strongly controlled by the position of the pre-existing graben.

REFERENCES

- Schreurs, G. (1994). Experiments on strike-slip faulting and block rotation. *Geology*, 22, 567-570.
- Schreurs, G. & Colletta, B. (1998). Analogue modelling of faulting in zones of continental transpression and transtension. In: Holdsworth, R.E., Strachan, R.A. & Dewey, J.F. (eds.). *Continental Transpressional and Transtensional Tectonics*. Geological Society, London, Special Publications, 135, 59-79.