



## Photograph of the Month: Thrust duplex, low-angle normal faults and domino-style faults in laminated shale, Mt Isa, Australia



Photograph Arne F. Scherrenberg. © Arne F. Scherrenberg.

This sample is from the Breakaway Shale in the Lake Moondarra area north of Mt Isa. An Australian one dollar coin, 23 mm in diameter, is shown as scale. The central part of the photograph shows a thrust duplex comprising seven horses, some of them internally folded. The roof thrust is very well defined, separating the shortened layers from the upper layers that do not record any contractional deformation. The basal décollement, on the right side of the photograph, becomes a low-angle normal fault toward the centre, whereas on the left, it is faulted by a right-dipping, high-angle normal fault that is partially overturned (rather than inverted) by contractional deformation. Together, these two faults define a graben. In the bottom right corner of the photograph, a series of domino-style faults and two antithetic, low-angle faults are also accommodating extensional deformation.

At least two deformation events are required to produce the observed horizontal shortening and horizontal extension. An earlier extensional episode is responsible for the development of the central graben. It is possible that the small buttress formed by the high-angle fault surface has triggered the small avalanche of duplexes focused around the pre-existing graben. The oversteepening of one of the central horses and the internal crumpling of the duplex layers also seem to be driven by that small buttress.

The earlier extensional structures show systematic brittle behaviour, indicating that they formed in partly or fully

consolidated rock. The deformation was probably associated with a rifting event in which these rocks were deposited (Page et al., 2000). The overprinting contractional structures formed under brittle–ductile conditions, possibly related to a later orogenic event. Location 139°34'43.39"E, 20°35'43.91"S. Sample presently in authors collection.

Please send comments to [jsg@uni-mainz.de](mailto:jsg@uni-mainz.de)

### References

- Page RW, Jackson MJ, Krassay AA. Constraining sequence stratigraphy in north Australian basins: SHRIMP U–Pb zircon geochronology between Mt Isa and McArthur River. *Australian Journal of Earth Sciences* 2000;47(3):431–59.

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