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Early to Late Cenozoic structural inheritance of Paleozoic basement structures in the northern Alpine foreland: examples from eastern France and northern Switzerland

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During his time at the Geological Institute of the University of Basel, Peter Ziegler was the main initiator of the EUCOR-URGENT project, a joint multi-disciplinary research and training programme aiming at a better understanding of seismic hazard, neotectonics and evolution of the Upper Rhine Graben and surrounding areas. Throughout the duration of the programme from 1999 to 2007 the EUCOR-URGENT network embraced more than 40 Ph.D. students, 20 Post-Docs and 18 senior researchers, who were based at one of the 25 involved universities or national organizations. Peter's natural drive, networking capabilities and scientific enthusiasm were without doubt the main reasons for this success story.

The Rhine-Bresse Transfer Zone (RBTZ) in eastern France, one of the natural laboratories investigated within the EUCOR-URGENT framework, is a major segment of the European Cenozoic Rift system (Ziegler, 1992) and formed by structural inheritance of the pre-existing Late Paleozoic Burgundy Trough. The Mid-Eocene to Oligocene evolution of the sinistral transtensional RBTZ was kinematically linked to crustal extension across the Upper Rhine and Bresse Grabens (Lacombe et al., 1993). From the Early Miocene onward the RBTZ further evolved under the influence of the far field effects of the Alpine collision involving Late Miocene to Pliocene NW-ward propagation of the thin-skinned Jura Thrust Belt but also thick-skinned reactivation of the Late Paleozoic and Paleogene fault systems in the RBTZ. In fact, shortening throughout the RBTZ appears to be still mildly active, as is indicated by one of the very few clearly oblique-compressive focal mechanisms in the northern Alpine foreland and evidenced by geomorphologic investigations that yielded Late Quaternary folding of fluvial meanders in the area of Besançon (Madritsch et al. 2010).

The Late Paleozoic Burgundy Trough as well as the Jura Thrust Belt continue eastward into northern Switzerland. In this area, reprocessed and newly acquired high resolution reflection seismic data allow further investigations regarding the modes of structural inheritance and in particular test the concepts of thin- and thick-skinned tectonics. Preliminary interpretation results confirm the fundamental role of pre-existing Paleozoic basement structures for the tectonic evolution of the Alpine foreland, throughout Cenozoic into neotectonic times.

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