Geophysical Research Abstracts,
Vol. 11, EGU2009-7639, 2009
EGU General Assembly 2009

Extension during convergence: The influence of orogen scale faults in the Eastern Alps

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The Miocene lateral extension in the European Eastern Alps - most prominently evidenced by normal sense detachments around the Tauern Window - is commonly explained by a retreating slab beneath the Carpathian arc hundreds of kilometres east of the orogen. However, analogue and numerical models for the Eastern Alps designed to describe the east directed lateral extrusion have failed to explain the extensional stress field in the region of the Tauern Window. Using a mechanical model for plan view deformation that honours internal faults we show here that orogen-scale strike slip faults are required to cause extension during plate convergence in the Miocene Eastern Alps. We test the idea by coupling our mechanical model with a landscape evolution model and by comparing modelled and observed drainage system geometries