



The role of inherited subduction asymmetries on the build-up of orogenic wedges: the Dinarides/Carpathians/Balkans and Eastern Alps/Dinarides connections

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The controlling mechanisms of orogenic shortening and collision govern the architecture of the coeval sedimentary infill of foreland and back-arc basins and their subsequent exhumation. Continental collision coincides with the onset of large-scale out-of-sequence deformation, modelling studies indicating that orogenic steady state largely involves exhumation in the core of the orogen, which is recorded in natural examples by hinterland exhumation associated with processes such as crustal-scale backthrusting. High convergence rates will apparently exhume large amounts of crustal material entering the collision zone along bi-vergent orogens defining a “retro-shear” type of collision. However, in “soft” collisional orogens (such as the Carpathians) the lower orogenic plate is not always a “conveyer belt”, i.e. transferring and incorporating material into the upper plate. The low convergence rates couple this lower plate distributing crustal exhumation all across the orogen due to the gradual shift of the lower plate accretion, defining a “foreland-coupling” type of collision mechanics.

The balance between the two types of collisions is less known. In the case of the Alps and the Hellenides-Balkanides systems, the “retro-shear” exhumation can also be alternatively defined as being in the direct continuation of pre-existing asymmetries from inherited subduction zones (such as the Dinarides or the Carpathians). These subduction zones evolved and were gradually closed/collided during Cretaceous and Eocene and are in the prolongation of the Southern Alps (and peri-Adriatic lineament) and the Balkans retro-wedges respectively. The activity of these retro-wedges is recorded during and/or immediately after the foreland-coupling collision of these neighbouring subduction zones with compatible kinematics. A causal relationship is therefore argued by means of structures, large scale profiling and quantitative reconstructions.