



Farewell signals of slab break-off in Vrancea, Romania from observation and numerical modelling

O. Heidbach (1), B. Müller (2), G. Peters (1), T. Buchmann (1), A. Oth (3), A. Nuckelt (4)

(1) Geophysical Institute, Universität Karlsruhe (TH), Germany, (2) Heidelberg Academy of Sciences and Humanities, Heidelberg, Germany, (3) European Center for Geodynamics and Seismology, Luxembourg, (4) Geodetic Institute, Universität Karlsruhe (TH), Germany, (oliver.heidbach@gpi.uni-karlsruhe.de)

Slab break-off and its geodynamic implications are on geological time-scales a short-term process. The Vrancea region in the SE-Carpathians is one of these rare places where the effects of this process on geological, geomorphological, geophysical, and geodetic signals can be studied in detail. In the Vrancea region Miocene subduction of oceanic crust of the Tethian Ocean was accompanied by a rollback of the subduction zone and slab steepening in its final phase after continental collision had started in Mid Miocene. Seismic tomography reveals that the high-velocity body beneath Vrancea extends today to a depth of 450 km in a vertical position. However, the coupling degree of the slab to the crust can not be resolved with seismic tomography and thus, it is an open question if (1) the slab is still attached to the crust, (2) the process of break-off is still in progress, or (3) if the slab has already been detached. Here we present the integrated interpretation of GPS measurements, stress field observations, attenuation of seismological waves, and geomorphological data. These data sets have in common that their signals track ongoing and recently terminated processes, but they do not preserve direct information on earlier stages of the slab's fate. The data analysis of the crustal stress and strain field reveals that they do not inhibit any long wave-length signal that would be expected from ongoing break-off or ongoing slab pull. This is also confirmed from a number of numerical experiments we performed. Thus, we conclude that the process of slab break-off ended several 100 ka ago and that no signal of this

process is left in the data sets discussed above.