Session 08

Earthquake nests: seismotectonics and clustering features

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Earthquake nests are commonly defined as the regions of concentrated and persistent seismicity that are isolated from nearby seismic areas. The most known and well-studied nests are located at intermediate depths in Vrancea (Romania), Hindu Kush (Afghanistan) and Bucaramanga (Colombia). All of them are associated with relic subducting processes located now beneath continental areas, where the seismicity at the surface is significantly lower than that at depth. Also, a few characteristics (higher stress drops, specific clustering properties, lack or deficit of aftershock activity, higher percentage of repeating earthquakes, etc.) differentiate the nest seismicity from shallow seismicity. Clustering of earthquakes in space and their continuous activity in time make the nests excellent natural laboratories for studying neotectonics at intermediate depths. The physical mechanism of intermediate-depth earthquakes is still under debate. A few candidate mechanisms were proposed, like dehydration embrittlement, thermal shear running instability, and metastable phase transition. They can trigger an abundance of earthquakes continuously in time and in small focal volumes. According to geodynamic models, mantle–crust decoupling processes (such as slab break-off, delamination, and thermal instability) with complete decoupling or decoupling in progress favour nest seismicity. High-quality hypocentre locations emphasize planar features in the nest seismicity. Also, significant attenuation and anisotropy properties characterize the earthquake nests. This session primarily targets scientific observations and modelling related to understanding the geodynamic evolution and seismotectonics of the earthquake nests. We also invite new disciplinary and especially interdisciplinary research approaches in a wide spectrum of fields, including seismology, geotectonics, geochemistry, petrology, and geophysics.