Session 17 & 50

Earthquake Source Mechanics

Conveners:
Simone Cesca[1], Satoshi Ide[2], Daniela Kuehn[3], Gesa Petersen[1]

[1]*GFZ, Germany*
[2]*University of Tokyo, Japan*
[3]*NORSAR, Norway*

Conveners:
Efthimios Sokos[1], Jiří Zahradník[2], Václav Vavryčuk[3], Pavla Hrubcová[3], Christos Evangelidis[4]

[1]*Geology Department, University of Patras, Rio-Patras, Greece*
[2]*Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic*
[3]*Institute of Geophysics, Czech Academy of Sciences, Prague, Czech Republic*
[4]*Institute of Geodynamics, National Observatory of Athens, Athens, Greece*

Recent high-quality seismic and geodetic observations provide large data volumes, which enable accurate determination of earthquake source parameters (locations, magnitudes, durations, moment tensors, etc.) and detailed imaging of spatio-temporal deformation processes. Further, techniques for extracting information using inverse problems and machine learning have improved substantially. The latest high-performance computing can numerically simulate the entire earthquake process from long-term tectonic loading and slow nucleation to rapid rupture propagation with strong motion radiation.

The session focuses on earthquake source processes, including slow earthquakes as well as intermediate and deep focus earthquakes. In addition to traditional earthquakes including foreshocks, aftershocks, swarms, repeaters, volcanic and induced events, we now observe various slow earthquakes such as tectonic tremors, low-frequency earthquakes, and slow slip events. Further, the nature of intermediate-depth and deep-focus earthquakes is still enigmatic. These events occur in subduction zones deeper than ~70 km despite the high pressure and temperature conditions prohibiting brittle rupture. The source process of these earthquakes could provide answers on slab state and deformation and ultimately explain the physical mechanism that controls their generation.

In this session, we invite contributions on data analysis and interpretation of earthquake source mechanics, on improvement and validation of analysis techniques, on theoretical and numerical modeling of kinematic and dynamic ruptures and earthquake sequences as well as observational and experimental studies on the physics of earthquakes. We also invite studies, in which seismic data are interpreted in terms of physical properties of slabs, especially of the intermediate-depth events of the Hellenic subduction.