

AOB Seminar

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開催日時: 2016年10月18日(火) 15:00-16:30

場 所: 地震・噴火予知研究観測センター A棟3階第二講義室

講演題目&要旨:

The Diversity of Earthquakes -Kinematics to Energetics-

“Kinematics” describes the motion of particles and systems. Seismology has made significant advances in the determination of kinematic parameters of earthquakes such as the hypocentral parameters, magnitude, mechanism, and source spectrum. Only half a century ago, it took months to years to estimate these parameters after the occurrence of an earthquake. In contrast, we can now determine accurate kinematic parameters of an earthquake in less than 30 minutes. This technological advance allows us to understand the diversity of earthquakes in terms of quantitative source spectrum which is important for quantifying tsunami and groundmotion hazard potential of earthquakes. Also, it enables seismologists to issue effective early hazard warnings. “Energetics” concerns with energy distribution and partitioning in a physical system. Although theories in fracture mechanics have been effectively used in seismology, understanding the energetics of rapid earthquake processes is difficult because of our limited capability for determining the absolute stresses in the Earth’s interior. We can measure only two energies in seismology, the energy radiated in seismic waves and a part of strain energy associated with faulting, and bold assumptions have to be made to proceed with this research. Despite this difficulty, progress is being made. Recent studies demonstrate that earthquakes are diverse not only in kinematics but also in energetics. The amount of energy dissipated near the fault zone relative to the radiated energy varies widely from event to event for both shallow and deep earthquakes. This result provides a key to a better understanding of earthquake physics. In this presentation, I will discuss some examples from our recent studies on large shallow and deep earthquakes.