

グローバルCOE地球惑星科学 特別講義

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The Diversity of Rupture Patterns of Subduction-zone Earthquakes

講義内容 :

Seismic hazard is often expressed in probability. However, seismological data are limited in time and the uncertainties in probability are hard to estimate. Also, because of the long time scale involved in seismicity, it is in general difficult to test probabilistic hazard maps. This difficulty has resulted in misunderstanding and confusion regarding the forecast of large earthquakes offshore of the Tohoku district. An alternative way toward long-term hazard assessment for subduction-zone earthquakes is to construct a general framework, construct a physically plausible model, assess its impact, and implement preventive measures. The first step would be to investigate the rupture patterns of the past subduction-zone earthquakes. Because of the very limited number of events, it is not practical to try to build statistics, but one can construct plausible models to guide our long-term planning. To this end, we investigate 1) the relationship between a megathrust earthquake and an outer-rise earthquake along the same segment of subduction zone, and 2) the relationship between a traditional mega-thrust event and a tsunami earthquake. Although one cannot expect consistent causal relationships, inter-event triggering seems to be an important factor to be considered. To understand the physics of triggering, a better understanding of rupture physics is important. For example, whether the up-dip portion of the 2011 Tohoku-oki earthquake where very large slip occurred has the characteristics of tsunami earthquakes or not is relevant to this problem. Although the conventional diagnostic parameter, the scaled energy, suggests that the rupture in the up-dip portion cannot be classified as a tsunami earthquake, the radiation efficiency of this portion is comparable to that of other tsunami earthquakes.

主催 : 東北大学 グローバルCOEプログラム
『変動地球惑星学の統合教育研究拠点』
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