

Monitoring, Imaging and Modeling Subduction Zones to Mitigate Subduction Zone Geohazards

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The subduction zones around Japan is the most instrumented subduction zone in the world. Densely deployed on-land seismic and geodetic network has been operating since the last two decades, and constructions of seafloor cabled earthquake-tsunami observation networks and seafloor geodetic stations are in progress. From recent observations using those networks and studies about past large earthquakes, it has been realized that recurrence intervals and areas of rupture zones of subduction earthquakes are more complicated than we thought. This implies that it would not be feasible to consider hazard mitigation based on a deterministic prediction of a large earthquake. However, increasing amount of data and improving quality of data bring a potential of alternative approaches to mitigate subduction zone hazards by. One successful approach is to establish an early warning system. An earthquake early warning system is being operated in Japan by JMA, and tsunami inundation early warning system start implementing. Another approach is to reveal a time-evolution of plate coupling in subduction zones, which should be helpful information for society to consider a possible action for preparing a future large earthquake. A next step we should proceed is to establish continuous real-time monitoring plate coupling in subduction zones. In order to do this, we need technological and scientific development of a real-time seafloor geodetic network and 3D structure imaging in subduction zones, which enable us to make 4D-monitoring in subduction zones.