Lessons for Earthquake Disaster Prevention Learned from Recent Disastrous Earthquakes, 2009 Suruga-wan Earthquake, 2008 Wenchuan Earthquake, 2007 Chuetsu-oki Earthquake, etc

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A new "National Seismic Hazard Map" published on 22 July, 2009. Very severe damage would be produced if the Tokai, Tonankai, and Nankai earthquakes far beyond magnitude 8 would happen simultaneously or successively. This "Hazard Map" has been making as one of the national projects integrating all fields of earthquake researches such as active fault, earthquake forecast and strong motion prediction studies after the Kobe earthquake. The earthquake forecast just before disastrous earthquakes is still not practical for reducing earthquake disasters as recent earthquakes such as 2009 Suruga-wan Earthquake, 2008 Wenchuan Earthquake, 2007 Chuetsu-oki earthquake have told us.

Strong motion prediction has been developed for promoting earthquake countermeasures learning from severe disasters of the 1995 Kobe earthquake in Japan. Ground motions from earthquakes caused to specified source faults are evaluated based on a "recipe" which has been made with information about active fault surveys scaling relations of fault parameters, and characterized source model from the waveform inversion of rupture processes using strong motion data. Verification and applicability have been examined by comparing synthesized ones estimated using the "recipe" with observed ground motions from recent disastrous inland-crustal-earthquakes such as the 2007 Chuetsu-oki earthquake (Mw 6.6), the 2008 Iwate-Miyagi Nairiku earthquake (Mw 6.9) and so on. Ground motions from these earthquakes are found to be predictable as long as the source faults are specified through investigation of active folds and faults.

We attempt to simulate strong ground motions during the 2008 Wenchuan earthquake of Mw 7.9 assuming the characterized source model. There were recorded some strong ground motions with distinct long-period pulses which seem to be generated from asperities defined as large-slip areas on the source fault. We shall improve the "recipe" to be able to estimate strong ground motions for such mega earthquakes of magnitude 8-class.

Further, we attempt to simulate strong ground motions on 11 August, 2009 Suruga-wan earthquake which occurred 20 km deep in the Suruga Bay. This earthquake is an intraslab earthquake and considered not to be related the the Supposed Tokai Earthquake according to the Japan Meterological Agency. The Supposed Tokai Earthquake is a plate-boundary earthquake on the upper side of the Philippine Sea plate. We conclude that the strong ground from these earthquakes can be simulated if the source informations such as locations, sizes, mechanisms, and so on are obtained in advance.