

## M=9.0 Tohoku Earthquake and tsunami; a new interpretation

MARUYAMA, Shigenori<sup>1\*</sup>

<sup>1</sup>Tokyo Institute of Technology

### M=9.0 Earthquake:

M=9.0 earthquake occurred at 3.11, 2011 and its unusually large magnitude has been discussed since then. Here I propose a different process from the Benioff plane origin, but along a spray-fault that destroyed the fore-arc region. This is a process of tectonic erosion to break the hanging wall of overriding lithosphere, and transport it into deep mantle, presumably in mantle transition zone to develop the 2nd Continents through time.

Origin of spray faults is a manifestation of physically unstable triangular region between material boundary (trench) and physical boundary (spray fault). The tightly connected Benioff thrust dragged down the frontal part of overriding plate to reactivate the spray fault to form M=9.0 earthquake.

### Tsunami:

The spray fault occurs right below the trench-slope break which is a turning point of slope change from shallow to deep trench inner wall. Right above the fault, sedimentary basin is present. Huge-scale submarine landslide occurred by the collapse of fulfilled sedimentary basin, which caused the tsunami off Sendai.

The river drainage system on NE Japan is remarkably different from SW Japan. Two major rivers, one from the north and another from the south to transport the eroded sediments on NE Japan meet in Sendai to carry them in the sedimentary basin off Sendai. This basin will periodically collapse, say, every 1000 years, to trigger tsunami.