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Constructing source fault models for the crustal earthquakes in Japanese Islands

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Constructing source fault model is significant for estimation of strong ground motion and evaluation of crustal activity, including seismicity and crustal deformation. Surface ruptures and crustal deformation associated with large earthquakes produces tectonic geomorphology and geologic structure. Thus, using active fault and fold data, we can estimated seismogenic source faults. However, in some cases, no surface ruptures are observed associated with large earthquakes, such as 2004 Chuetsu earthquake, 2008 Iwate-Miyagi inland earthquake. Recent progress on the blind active fault is as follows:

1. seimogenic source fault beneath the fold-and-thrust belt in Niigata. The existence of shallow detachment in the Neogene post rift mudstone, makes the relationship between deep sited seismogenic source fault and near surface active fault complicated due to thin-skinned deformation processes. Present days seismogenic source faults in this area are reactivated normal faults, formed in Miocene rifting period and transfer and trans current fault formed backarc opening processes plays significant role on segmentation of source faults.

2. Blind fault covered by young volcanic products: 2008 Iwate-Miyagi earthquake manifested the significance of blind fault covered by young volcanic products. As a similar example, we found possible active faults beneath the flank of Mt. Fuji by seismic reflection profiling (Sato et al., 2012; Ishiyama et al., 2012 JpGU).

For constructing a source fault model, an integrated, multi-deciplinary approach is needed, including geologic and crustal architecture and seismicity. We need to examine the tectonic geomorphological data, with geologic structure, gravity anomaly data, seismicity. We constructed rectangular fault models in Northern Honshu as a first step (Sato et al., 2012 JpGU). It will be updated by the increased information in the future.