

Relationship between segmentation of subduction zone and inland strain accumulation in northern Honshu Japan

Shinji Toda[1]

[1] Active Fault Research Center, GSJ/AIST

Numerous destructive shallow earthquakes in the northern Honshu such as the M6.8 2004 Niigata-ken Chuetsu earthquake are originated from the EW-compression due to coupling of overriding inland plate and westward moving Pacific plate. But recent complicated 2D cross section models, which are introduced to explain the long-term persistent EW compression despite of strain release by subduction earthquakes, have been perturbing the simple consensus. Here we argue that the compression derived from the Pacific plate is effectively transmitted to inland regardless of the subduction earthquakes. This is because a source area of the subduction zone in the offshore Tohoku is not large enough to release the entire strain accumulated during the subduction seismic cycle and the other un-ruptured segments sustains the plate coupling. Thus, from long-term viewpoint, unless the entire subduction segments rupture simultaneously, EW-compressional stress is stable inland without any temporal significant strain release. We imply that the segment structure and each dimension of the source along subduction zone generally control the strain accumulation style and earthquake occurrence, as well as the traditional discussion of plate age and subduction angle.