

Discordance of deformation structures between surface and depth in crust; case study in the Niigata fold belt, Japan

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In Plio-Pleistocene sedimentary units in the Niigata fold belt, we observed the many mesoscale faults with which the macroscale faults in the depth of the crust discord. We applied the stress tensor inversion to the mesoscale faults. It is difficult to apply stress tensor inversion to fault-slip data collected from highly tilted rock masses. For this purpose, researchers have attempted to estimate the relative ages of faults at outcrops. However, such fault sorting is not always possible. Recently, based on the multiple inverse method (Yamaji, 2000) we have developed the bedding tilt test for paleostress analysis (Yamaji et al., 2005) similar to that used in paleomagnetism (Butler, 1992). Since folding causes horizontal shortening and vertical extension of a sedimentary rock mass, reverse faulting stress regime is most probable for regional state of stress. However, it was shown that normal faulting and strike-slip faulting stress regimes were dominant in the Niigata fold belt. Consequently, we show that the deformation structures in the surface differ from the ones in the depth in the crust of the area.