Japan Geoscience Union Meeting 2010
(May 23-28 2010 at Makuhari, Chiba, Japan)

SSS023-09 Room: 302 Time: May 25 16:15-16:30

Stress change related to fault activities in an accretionary wedge: Insight from numerical simulation

Ayumu Miyakawa[1*], Takeshi Tsuji[1], Yasuhiro Yamada[1], Toshifumi Matsuoka[1]

[1]Kyoto University, Graduate School of Eng

An accretionary wedge which is widely distributed in plate convergence zones shows highly deformed geological structure. Transition of accretionary wedge structures is assumed to be related to the up-dip limit of the seismogenic subduction zone (Kimura et al., 2007). Stress and physical properties at the area form the highly deformed structure. We modeled formation process of an accretionary wedge by using numerical simulation, and calculated stress distribution in the modeled accretionary wedge. The simulation results show us the relationship between dynamic stress change and deformation during the formation process of the wedge.

Stress patterns in the wedge change in each deformation stage. The direction of the maximum compressive stress (MCS) is vertical in the sedimentation stage. In the pre-frontal thrust stage, the magnitude of MCS increases and the inclination of MCS rotates to horizontal. The inclination of MCS then rotates to normal to the frontal thrust surface while this surface is moving. In the post-frontal thrust stage, the direction of MCS again changes to horizontal.

These results suggest that these differences in the stress patterns are related to the wedge deformation. Especially fault activity changes the stress pattern dramatically. Our analysis suggests that the horizontal component of the stress decreases along the fault while the fault is active, and this decrease makes the rotation of MCS.

We are now continuing the analysis to reveal the relation between stress and deformation in the wedge and can be shown at the meeting.

Keywords: Accretionary wedge, Numerical simulation, Stress, Fault formation