Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

SSS30-P28 Room:Poster Time:April 29 18:15-19:30

Paleostress analysis of a subduction zone megasplay fault - An example from the Nobeoka Thrust, Japan

KAWASAKI, Ryoji[1*] ; HAMAHASHI, Mari[1] ; FUKUCHI, Rina[1] ; HASHIMOTO, Yoshitaka[2] ; YAMAGUCHI, Asuka[3] ; KAMEDA, Jun[4] ; HAMADA, Yohei[5] ; KITAMURA, Yujin[6] ; OTSUBO, Makoto[7] ; KIMURA, Gaku[1]

[1]Dept. Earth and Planet. Sci., Univ. Tokyo, [2]Kochi Univ., [3]Atmosph. Ocean Res. Inst., Univ. Tokyo, [4]Hokkaido Univ., [5]Japan Agency for Marine-Earth Science and Technology, [6]Kagoshima Univ., [7]AIST, Geological Survey of Japan, Inst. Geology and Geoinformation

The megasplay faults in subduction zones, branching from plate boundary thrusts, are thought to have a potential to generate earthquakes and accompanying tsunamis. It is therefore important to understand the fault mechanism of megasplay faults for earthquakes and tsunamis occuring in subduction zones. Paleo-splay faults exposed on land often preserve clear deformation features of the seismogenic zone and provide information on the fault mechanisms at depth. One of the important informations that can be obtained from exhumed faults is paleo-stress field. Here we investigated the Nobeoka Thrust, a fossilized megasplay fault in the Shimanto Belt in Kyushu. The hanging wall is Eocene Kitagawa Group, composed of phyllitic shales. The footwall is Eocene to early Oligocene Hyuga Group, composed of foliated cataclasite originated from sandstone-shale melanges. The thrust has been active during the period of 48-40 Ma [Hara and Kimura, 2008]. The hanging- and the footwall have experienced maximum burial temperatures of approximately 320^{o}C and 250^{o}C, respectively [Kondo et al., 2005]. The existence of klippes apart from the Nobeoka Thrust shows that the Nobeoka Thrust is nearly horizontal in regional scale [Murata, 1991, 1995]. Kondo et al. (2005) described two orientations of slickensides from the outcrop, suggesting the existence of flexural gentle fold in kilometer scale. In addition to the previous studies focusing on outcrops, scientific drilling has performed in 2011 penetrated through the Nobeoka Thrust, and core samples and geophysical logging data are obtained. The cores provide important information for investigating geological features under the ground and have an advantage without surface weathering.

In this study, we analyzed paleo-stress from slip vectors on small faults observed in the cores. Small faults are expected to be less-reactivated. The number of small faults is much larger than that of large faults, accordingly, high statistical reliability is expected. Multiple inverse method (MIM; Yamaji, 2000; Otsubo and Yamaji, 2006) was applied to the small faults. K-means clustering (Otsubo et al. , 2006) was applied to stress tensors detected by the MIM for estimating optimal solutions. Preliminary results indicate the presence of solutions with three maximum horizontal stress axes: N85.24^{o}E, N30.07^{o}W and N65.47^{o}E. We examined the formation process of the Nobeoka Thrust based on the results and slickensides on the outcrop. Our results would provide potential insights to the fault evolution of a megasplay fault in subduction zone.

Keywords: Nobeoka Thrust Drilling Project, Subduction zone, Shimanto Belt, paleo-stress, Multiple inverse method