T234-P004 **Room: Poster Session Hall** **Time: May 19**

Stress analysis of a deep subduction zone using micro-fault and mineral veins.

Takayuki Kirikawa[1]; Yoshitaka Hashimoto[2]; Taketo Kikuchi[3]; mie takagi[4]

[1] Natural Environmental Science, Kochi Univ.; [2] Dep. of Nat. Env. Sci., Kochi Univ.; [3] Environmental Studies.,Tohoku Univ; [4] Natural and Environmental Sci., Kochi Univ.

Stress conditions in accretionary complex is important to understand formation of melange, underplating and seismogenisis along the subduction zones. The stress is strongly influenced by the fluid -P. The effective stress affects directly on the strength of rocks. The purpose of this study is to estimate the lithostatic-P from on-land accretionary complex, and understand the relationship between lithostatic-P and fluid-P. The study area is the Yokonami melange, the Cretaceous Shimanto Belt, ranging from the boundary fault located at the northernmost part of the Yokonami melange to the south, about 530m wide. The coast line trends from north to south, which is the almost perpendicular to the direction of melange foliation.

In the first, micro-fault analysis was conducted. Strikes and dips of the fault-plane every 1m in the study area were measured. In addition, I have measured rakes and senses of striations developing on a fault-plane with the mineral vein. After that, to estimate the best fitted stress direction and stress ratio, Multiple Inverse method was conducted. In the result, under the assumption that the micro-faults in the study area were formed after formation of melange and before underplating, which is supported by the distribution of rocks and mineral veins, the best solution was obtained as the stress direction [siguma^1 203, 28 siguma^2 103, 19 siguma^3 345, 55] and stress ratio [0.1]. This result represents the good accordance with the estimated numerical value at shallow portion of accretionary prism. Therefore, I should say that this is the stress direction alongside the decollment at the time of the micro-faults formation.

Combining the stress ratio 0.1 estimated before, average of differential stress 273.3MPa which was deduced from density of calcite twin(Rowe and Rutter, 1990) in this study area, angle of internal friction 30 degree C and cohesion 3MPa (Carmichael,R.S., 1989) which are general values of a black shale, the absolute value of maximum, intermediate, and minimum principal stresses were calculated. The result indicates that the principal stresses are siguma^1 404.8MPa, siguma^2 158.8MPa, siguma^3 131.5MPa. The mean value of the stresses might be indicate the lithostatic-P, about 231.7MPa. The mean fluid-P obtained from the micro-thermometry of fluid inclusion in the vein along micro-faults was 178.1MPa. If this fluid-P affected on the formation of micro-fault, maximum, intermediate, and minimum principal stresses are deduced as siguma^1 582.9MPa, siguma^2 336.9MPa, and siguma^3 309.6MPa. And then, the lithostatic-P is 409.8MPa.

The abnormal fluid-P ratio which indicates the relationship between the lithostatic-P and the fluid-P is represented by a following expression.

ramuda$^{\Lambda}$=(fluid-P - hydro-P) / (litho-P - hydro-P)

Calculated abnormal fluid-P ratios is about 0.6 if it not were consideration of the fluid-P effect on the faulting, and if the fluid-P effect on the breaking is considered, the abnormal fluid-P ratio is about 0.1. Using the rock density as 2.65 g/cm^3(Hada, S, 1988), depths were estimated as about 8km without fluid-P effect and about 15km with fluid-P effect. The former result is in the general range of depth of the seismic-front in the modern example. Therefore the 0.6 of abnormal fluid-P ratio can be reasonable to understand the natural condition. In addition, this result strongly suggests that the fluid-P does not affect on rock-breaking at the time of micro-fault formation.

-References-

Camichael, R. S., 1989, Practical Handbook of Physical Properties of Rocks and Minerals. CRC press, Boston; Hada, S, 1988, Physical and Mechanical Properties of Sedimentary Rocks in the Cretaceous Shimanto Belt, Modern Geology, v.12, p. 341-359; Rowe,K.J., and Rutter,E.H., 1990, Journal of Structural Geology, v.12, 1-17.