Visualization of the stress distribution of the seismic center dislocation ~riverbed outcrop Chomon-kyo as an example~

*Mizuki Syouji[1], *Kaho Tanaka[1], Momoka Ota[1], Suzuka Kugizaki[2]

1.Yamaguchi Prefectural Hagi Senior High School, 2.Yamaguchi Prefectural Tokuyama Senior High School

We have been conducting a study to reproduce the stress that was applied to the rock formation when the Tokusa-Jifuku fault was active. The stress that moved the fault cannot be measured after the movement, but the size of the crack in the rock is related to the size of the stress that was applied to the rock. So we hypothesized that the stress that was applied to the rock can be deduced by measuring the crack density as well as the distance of the crack from the fault surface.
We chose a location on the host rock where we could measure the area per 10 cracks. To determine the corrected crack density, we calculated the rough crack density and standardized it by comparing it with a known value on a line perpendicular to the fault.
Here are the results: the closer the cracks are to the fault surface, the higher the density becomes and the farther the cracks are from the fault surface, the lower the density becomes. We found that this is the fractal distribution. The fractal dimension is 0.5.
We concluded the following. Stress concentrates on the shear zone of the fault, and attenuates in inverse proportion to the square root of the distance.
This result of this calculation corresponds with the theoretical value of the stress in the Griffith Theory which is used in the field of fracture mechanics. Based on the measurement of the crack density, we believe that the relative stress distribution was reproduced.
The distribution of the relative stress has a fractal dimension of 0.5. This suggests that the earth's crust, which is considered to be an elastic body, has a large number of cracks which falls within the fractal distribution.
This also suggests that the host rock can be destroyed by fault movement, because stress is concentrated on the edge of the crack. Therefore, when the crack grows, the rock can be destroyed
Furthermore, fractal distribution appears in the destruction of other familiar objects, such as Aosaebisen sea lettuce shrimp cracker .

Keywords: Tokusa-Jifuku fault , stress, visualization

