

Relation between Anomalous activities of Atotsugawa Fault and water – A working hypothesis

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Atotsugawa fault is at the boundary of Toyama and Gifu Prefectures. The strike is NE-SW, and its length is about 70 km. The latest large earthquake was Ansei Hietsu earthquake (1858). Geophysical observations have shown its interesting characteristics.

1) Seismicity

Microearthquakes have been occurring along Atotsugawa fault. The activity is high in the eastern and western parts, on the other hand, low in the central part. Shallow earthquakes (0-3km) are lacking in the central part. The depth limit is around 5km at the eastern and western ends, around 15 km in the central part.

2) Crustal deformation

Geodetic measurements and GPS observations have shown a creeping motion along the fault in the central part. Such a creeping motion has never detected in the eastern and western parts.

We propose a working hypothesis to explain characteristic activities of Atotsugawa fault.

(1) Difference in the depth limit

It is impossible to explain the difference in the depth limits by the difference in the surface heat flow. Our working hypothesis is that the high pressure of water deepens the depth limit in the central part.

(2) Creep motion

The geoelectrical survey (Goto et al., 2004) shows that the resistivity at shallow depths is low in the western part and high in the central part. The difference in the resistivity reflects the difference in the amount of water in the shallow part. Our working hypothesis is that the fault healing has been enhanced by water in the western part after Ansei Hietsu earthquake. On the other hand, the fault healing is slow in the central part due to the lack of water.

Our poster will compare physical properties of rocks and geophysical observations, and discuss the existence of water, the pore pressure and the depth limits.