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# Microstructure of mylonite in Hatagawa fracture zone and its formative history

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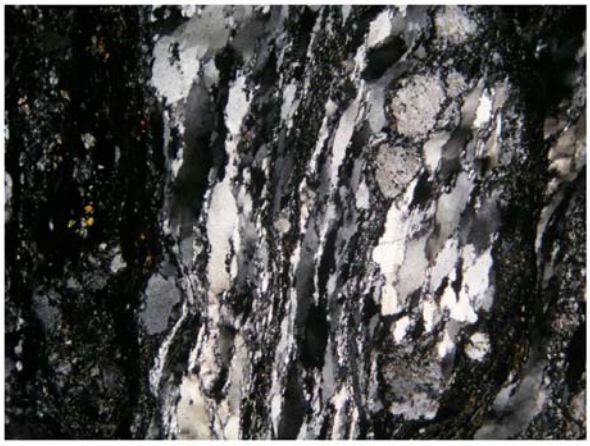
Hatagawa fracture zone (HFZ) places north-east of Fukushima-prefecture and has the north-northwest ? south-southeast strike. It is understood that Granite intruded had been subjected shear from 89Ma to 110Ma from K-Ar dating. Rocks of HFZ is strongly deformed, and its microstructure is categorized into A, and B( Shigematsu et al., 2003).
Microstructure B is distributed over HFZ from north to South, and quartz in B is equigranular and elongated evenly in general. C-axis fabric of quartz shows y-axis concentration. Microstructure A is distributed only in narrow area in west side of HFZ, and quartz in A is elongated strongly and surrounded by minute crystals of quartz. C-axis fabric of quartz shows type I cross girdle. Difference between microstructure A and B is because of gap of temperature-strain rate when the microstructures developed. It is revealed that A deformed in 573~633K and B deformed in 613~753K from two-feldspar thermometer( Shigematsu & Yamagishi, 2002).
In this time, this study took sample rocks having microstructure A and B, and peer through a microscope at them (see Fig). Following are their results.

Microstructure A



Microstructure B' and A

1. Microstructure A and B'
In rock having microstructure A, the nearer from zone where deformation concentrates (DCZ) the larger the aspect ratio of quartz is, and the more minute crystals surround larger quartz grains. But in farther area (over 1cm far from DCZ), deformation type of quartz differs from A a little. It is alike B, but has subgrains on rims of quartz grains (This study named it microstructure B'). In area 1cm far or farther from DCZ, some of B' is deformed strongly, and in central part of demformation, there is A.
2. Hydrous minerals
2-1. In rock having microstructure A

In DCZ, there are epidote layers and scattered chlorite. And in the other area, there are many layers of chlorite (which is replaces biotite) elongated parallel to shear sense. Microstructure A cuts a curved layer of epidote.
2-2. In rock having microstructure B
Both in DCZ and in the other area, there is much of biotite, but epidote and chlorite are very few.

From these observations, Following relationship between A and B can be inferred. A came into being after B did, but the rag of time is not so clear. And not only temperature, but also municipal strain rate change may causes development of microstructure A. Presence of water caused the decrease in temperature and increase in strain rate, and change the deformation type from regime 3 to regime 2 (about "regime", see Hirth & Tullis, (1992) and Sigematsu, (2009)). If this analogism is right, microstructure A is allowed to evolute in crustal condition microstructure B is ductile. These discussions become credible when scenes that microstructure B cut microstructure A will be observed.

This study will aim to understand panoptically how microstructure to come into being and to contribute for earthquake occurrence by observation and analysis rocks including microstructure A, B, and B', by estimation their temperatures and strain rates, and by homologizing them to graphs for Temperature - age (Ohtani et al.,2005) and for Thickness of deformed zone ? deformation duration (Tanaka et al., 2002),