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課題名　Study of microstructures of the deep crustal rocks of high-strain zones related to transcontinental orogeny

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The present study focuses on the progressive microstructural development in a granitic rock during Proterozoic deep to shallow-crustal high-strained areas of Central Indian Tectonic zone, India, which is a prominent transcontinental-scale suture zone encompassing India, China and Australian continents of Precambrian time. The deformation history of this zone corresponds to the movement of the crustal boundary during the orogenic pulses related to the formation and breakdown of the Rodinia supercontinent. This rock is ideal for microstructural study as it records an early mylonite development stage, a subsequent fault-related pseudotachylite generation stage and a second generation of reactivated fault-related pseudotachylite development. It is a matter of broad consensus that the studied unit had suffered multiple events of deformation at different depths in the crust. Of particular importance is the deformation event related to the development of pseudotachylites, possibly during paleo-fault movement. The microstructures of the host rock and different stages of pseudotachylite development hold the key to understand the style and mechanism of deformation related to exhumation of deeper parts of an orogenic belt.

The presently studied rock is important as all the three above-mentioned microstructural subdivisions (e.g. mylonite to pseudotachylite) are observed in a thin section scale. So far, we have studied the microstructures using FE-SEM at ISEI. The overall important observations are as follows.

(a) We have identified datable minerals like sphene developed in the pseudotachylite veins which shall be dated to fix the age of these paleo-faulting.

(b) Using SEM-EBSD at ISEI, We have analyzed the quartz microfabrics of three different domains, e.g. matrix of the pseudotachylite veins, band showing fine-grained gouge like materials, and surrounding mylonites. They possibly record evidences of different deformation events occurred at different pressure-temperature conditions. We shall do a comparative study on these microstructures.