Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

MIS32-16 Room:304 Time:May 24 14:30-14:45

Anisotropic resisitiviy profiles and fault rock microstructures in fault zones

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[1]Nat'l Res Inst Earth Sci Disast Prev

Structure and frictional characteristic in a fault zone are not homogeneous, and the inhomogeneity should be related to earthquake generation mechanism. However, main features of the inhomogeneity in fault zones are not yet sufficiently understood. I consider it is effective to compare geophysical data, such as seismological and/or physical survey data, and fault rock microstructures and mineral compositions in the fault zone. In this presentation, I report the results of comparisons of two cases of Hatagawa and Atotsugawa fault and suggest the factors affecting the inhomogeneity of fault structure. We compared the anisotropic resistivity profile by laboratory measurements of fault rocks and physical survey across the fault zones with microscopic observations and mineral composition analysis of fault rocks provided by drilling into the fault zone. As a result, the anisotropic resistivity profiles are strongly related to foliation structure of fault rocks. It is suggested that, during earthquake recurrences, foliation fabric is developed and resistivity profile becomes anisotropic progressively, and that, in other words, the anisotropic resistivity profile of fault zone reflect the fault activity history.

Keywords: resisitivity, anisotropy, physical survey, fault zone, microstructure, activity history