Meso and microstructures of non-active crush zone in granite at the Monju site

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Examples of meso- and microstructures of non-active minor crush zones are useful for an activity evaluation of minor crush zones. Crush zones to be evaluate (active or non-active) during important building constructions are usually minor crush zones. Research on the deformation structures of such minor crush zones is rare. We show the example of meso- and microstructures from non-active minor crush zones in granite located near the prototype of fast breeder reactor Monju. The activity of the minor crush zone ceased at intrusion of basaltic dyke (ca. 19 Ma; Sueoka et al., submitted). A right-lateral slip (ca. 10 cm) along the principal slip zone is observed along one of the minor crush zones. Along the principal slip zone, dragged strain maker indicate mean shear strain of 1.6 within 9.3 mm thick zone assuming that the deformation was simple shear. These mesoscopic observations suggest that the deformation was ductile. A 1-cm-thick cataclasite zone mainly consists of quartz, plagioclase, K-feldspar and biotite. Clay minerals due to alteration of plagioclase are observed. Dynamic recrystallization of quartz is not observed. Most of the quartz and feldspar fragments are between 0.5 and 1 mm in size. Biotite in the zone is typically stretched and defining foliation of the cataclasite. The sigmoidal shape of the biotite indicates a right-lateral sense of shear for the foliated cataclasite. The coexistence of the intracrystalline plastic deformation of biotite and the crushing of other granular minerals in the foliated cataclasite indicates that the most recent slip is the semi-brittle flow. The deformation microstructure of biotite indicates that the deformation condition of the latest slip is high-temperature and the minor crush zone is non-active fault.

References: Sueoka et al., Fission-track dating of faulting events accommodating plastic deformation of biotites. JGR-SE submitted.

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