Microtextural evolution of quartz and feldspar during shear zone formation

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CPO of quartz and plagioclase were analyzed by SEM-EBSP in the Hatagawa Fault Zone in NE Japan. Formation of quartz random CPO is accompanied by the development of trains of isolated quartz grains in the ultramylonite. Fine plagioclase from mylonite and ultramylonite show random CPOs, even though these show well-developed dislocation substructure. The random quartz CPO suggests that fine feldspar is weaker than quartz. The random CPOs and the dislocation substructure in fine plagioclase could be explained in two ways, dislocation creep without dominant slip systems or grain boundary sliding with dislocation creep. The results suggest the significance of the rheology of fine feldspar and that there is an environmental control on mechanisms in plagioclase that we do not yet understand.