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ROLE OF PHYLLOSILICATES ON RHEOLOGICAL WEAKENING OF DETACHMENT SHEAR ZONES (RAFT RIVER MOUNTAINS, UT)

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Fluids are commonly invoked as a primary cause for weakening of the rheology of detachment shear zones. However, fluid related mechanisms (e.g. pressure-solution, reaction enhanced ductility, reaction softening, development of fabric, and the precipitation of phyllosilicates) are not well understood. Fluid-facilitated reaction and mass transport leads to rheological weakening and strain localization and the departure from experimental failure laws derived in the laboratory. Here we focus on the mechanical role of phyllosilicates, which are inherently weak due to the ease of shear along their basal plane. As phyllosilicates recrystallize, they tends to form interconnected networks. Slip along the basal planes of phyllosilicate grains plays an important role in strain localization and has been observed in experimental work, theoretically proposed, and numerically modeled. However the mechanical role of phylosillicate weakening of a detachment shear zone has not been adequately explored in nature. We conduct our analysis on the east-rooted, Miocene Raft River detachment shear zone, localized in a ~100 m thick quartzite (~90% quartz, ~10% muscovite) dominated DSZ. Muscovite content, spatial distribution, arrangement and interconnectivity is investigated by thin section analysis and CT-scanning. Preliminary results indicate that quartz microstructures change with the amount of muscovite present in the quartzite, suggesting that phyllosilicate precipitation plays a role in quartz deformation and strain localization.

Session No. 126--Booth# 316
T73. Structural Geology in the 21st Century: Rheology of Naturally Deformed Rocks (Posters)
Monday, 23 September 2019: 9:00 AM-6:30 PM

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