

The presence (or absence) of fluids and their introduction or redistribution by localized or more pervasive flow has a first-order effect on the physical, chemical and mechanical evolution of the continental crust. Fluids interact with rocks when they are deformed and/or metamorphosed and then possibly exhumed, and enhance mineral reactions and partial melting at depth. Fluids are also major contributors to mineralization and ore deposition. Fracture systems and fault zones are preferred pathways for fluids, and in turn physical and chemical interactions between fluid flow and tectonic structures strongly influence the mechanical behavior of the crust at different space and time scales. Fluids exert a strong effect on crustal rock strength. They influence dislocation creep and recrystallization of rock-forming minerals and permit pressure solution and chemical reactions to occur, thus stiffening the rock by depositing cements and/or weakening it through development of low-strength hydrated mineral phases, such as phyllosilicates. Increased pore fluid pressure reduces the fracture strength of rocks and can promote the interplay between creep, fracture and (localized) fluid flow.

During orogenic evolution for instance, large amounts of fluids are released in rocks by successive metamorphic dehydration reactions occurring during burial. This occurrence of fluids, especially water, has crucial effects on the scale of mass transfer processes and fluid–rock interactions, but also on the crustal deformation mechanisms, rock rheology and partial melting at depth. Alternatively crustal rock may deform or melt under dry conditions. This session aims to provide a forum for summarizing our knowledge of fluid-rock-tectonics interactions, of fluid sources and pathways in the crust and of the extent to which fluids influence, and in turn are influenced by, rock composition and physical/rheological properties and structures (folds, faults and shear zones) at different crustal levels. We welcome contributions on the role and behavior of fracture systems and fault zones during fluid circulation in the continental crust (e.g., transient vs long-term fluid-rock interactions), on regional/case studies, on recent advances in methods and techniques for fluid characterization and fluid pathway reconstruction, and on fluid-rock interaction modelling.