Tracking feedbacks between fluid-rock interactions and brittle-ductile deformation processes in mantle wedge jadeitites

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Deformation processes in the mantle wedge near the subduction interface are still poorly understood, especially as this region is often considered aseismic even though more and more seismic events are reported. Although geophysical evidence points out the role of fluid injection from the slab into the mantle wedge for triggering brittle deformation, the precise mechanism and the origin of the fluid remain unclear. Jadeitites, commonly found in serpentinite mélanges, are directly related to these slab-derived fluids and are thus particularly useful for getting insights into fluid-rock-deformation interactions above the subduction interface. This study investigates deformation related to mineralogical and chemical evolution in jadeitites from three different localities: Sierra del Convento (Cuba), Kachin state (Myanmar), and Borus Belt (Siberia). Microprobe data show that all samples display a complex mineralogical evolution with at least three generations of clinopyroxenes eventually associated with other mineral phases. Moreover, all the studied samples display brittle and ductile deformation features coeval with high pressure paragenesis. The Cuban samples were affected by mylonitisation, cataclasis and probably hydraulic brecciation during the growth of jadeite replacing a first generation of pure jadeite and omphacite. In Myanmar samples clinopyroxenes are closely associated with amphiboles, with a succession of five amphibole species from calcic to sodic composition. However, this evolution is not linear and suggests some complexity in the evolving PT conditions and fluid composition. These rocks from Myanmar were affected by several brecciation events forming clasts of sodic-calcic amphiboles and pure white jadeite cemented by sodic amphiboles, less pure jadeite or omphacite. The Siberian samples show evidence for strong shearing during jadeite and omphacite growth and can be interpreted as foliated cataclasites, a structure commonly related to fault slip at seismic to sub-seismic rates. These findings disclose complex and intricate relationships between influx of a metasomatizing fluid and brittle-ductile switches (Angiboust *et al.*, 2021).

Angiboust, S., Muñoz-Montecinos, J., Cambeses, A., Raimondo, T., Deldicque, D. & Garcia-Casco, A., 2021. Jolts in the Jade factory: A route for subduction fluids and their implications for mantle wedge seismicity. *Earth-Science Reviews* **220**, 103720.