Geophysical Research Abstracts,
Vol. 10, EGU2008-A-06648, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-06648
EGU General Assembly 2008


# The importance of talc and chlorite 'hybrid' rocks for volatile recycling through subduction zones; evidence from the high-pressure melange of New Caledonia

**C. Spandler** (1), J. Hermann (2), K. Faure (3), J. A. Mavrogenes (2,4) and R. J. Arculus (4)

(1) Institute of Geological Sciences, University of Bern, Switzerland, (2) Research School of Earth Sciences, Australian National University, Canberra, Australia, (3) National Isotope Centre, GNS Science, Lower Hutt, New Zealand, (4) Department of Earth and Marine Sciences, Australian National University, Canberra, Australia

Recent advances in our understanding of deep subduction-zone processes indicate that the transfer of fluid and trace elements from the slab to the mantle wedge cannot be adequately explained by simple models of slab devolatilization. The eclogite-facies mélange belt of northern New Caledonia comprises previously subducted oceanic crust and contains a significant proportion of talc and chlorite schists associated with serpentinite. Although these rocks have not been considered as significant components of subducting slabs, they host large quantities of $H_2O$ and $CO_2$ and may transport volatiles to deep levels in subduction zones. Using the bulk-rock and stable isotope composition of the serpentinite, talc schist and chlorite schist, we show that the serpentinite was formed by seawater alteration of oceanic lithosphere prior to subduction, whereas the talc and chlorite schists were formed by fluid-induced metasomatism involving mafic, ultramafic and metasedimentary rocks in mélange zones during subduction. In subduction zones, dehydration of the talc and chlorite schists occurs at sub-arc depths and at significantly higher temperatures ($\sim$ 800 ˚C) than other lithologies (400-650 ˚C). Fluids released under these conditions may carry high trace-element contents and may trigger partial melting of adjacent pelitic and mafic rocks, and hence may be vital for transferring volatile and trace elements to the source regions of arc magmas. In contrast, these hybrid rocks are unlikely to undergo significant decarbonation

during subduction and so may be important for recycling carbon into the deep mantle.