Various chemical composition of fluids released by subducted oceanic crust: Evidence from the Tianshan meta-subducted complex, NW China

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The vein network in the Tianshan HP-rocks appears to consist of both locally derived dehydration segregations and veins and externally derived transport veins on the basis of the textural, petrographic, and geochemical evidence of veins and their host eclogites/blueschists [1, 3]. Although omphacite is a main constituent of the vein, the modal abudances of other minerals such as garnet, zoisite, quartz, rutile and carbonate minerals are usually varying widely for separate veins. In general, the vein can be classified as two representative types, the omphacite-rich (Omp > 80%) and the rutile-rich (Rt up to 20%) veins. These distinct mineral constituents of veins suggest that fluids with various chemical compositions may have been released by the host rocks during subduction of oceanic crusts.

For the rutile-rich vein, both a segregation with a depletion halo, thought to represent initial mobilization during dehydration, and a transport vein, indicative of the long distance transport were investigated in detail [2]. Textural and geochemical data for the eclogite-facies vein minerals indicate that Ti–Nb–Ta-rich fluids were transported over long-distances (at minimum meter-scale) during fracture-controlled fluid flow. Complex forming ligands (e.g., Na–Si–Al polymers and F^-) may have enhanced the solubility of Ti, Nb, and Ta in the fluid. Changes in fluid composition (e.g., X_{CO2}) may both precipitate rutile and fractionate Ti, Nb, and Ta from LILE and REE.

For the omphacite-rich dehydration vein, the fluid contained relatively high concentrations of LILE, Li, Pb, U and P and low concentrations of REE. After LILE depletion, the relict aqueous fluids will trigger the eclogitization of the blueschist alteration zone when they pass through host blueschists.

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Variation of nutrients in response to the highly dynamic suspended particulate matter in the Changjiang (Yangtze River) plume

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During the four surveys at spring and neap tides in July and November 2005, continuous observations were conducted at four stations adjacent to the Changjiang (Yangtze River) mouth. The observation times lasted for 26 h that covered two consecutive semidiurnal cycles. Resuspension events and subsequently enhancements of suspended particulate matter (SPM) were commonly observed within a tidal cycle. Although nutrients (SiO_3^{2-}, NO_3^-, and PO_4^{3-}) were primarily governed by salinity, its statistically significant correlations with SPM could always be extracted after partial correlation analysis. And three-parameter (salinity, SPM, nutrients) regressions generally produced better results of simulating nutrient concentrations than two-parameter (salinity and nutrients) regressions, although the former R^2 values were elevated by no more than 13%. The partial correlation between SPM and a specific nutrient could be both positive and negative in different surveys, suggesting SPM influenced the nutrients by different manners under various conditions. The minor (albeit statistically significant) impacts of highly dynamic SPM on nutrients might be ascribed to the short duration time of resuspension events (commonly several hours), together with the complex nature of circulation in the Changjiang Estuary.

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