

Controls on isotope and trace element systematics of slope facies Ediacaran carbonates, Yangtze Platform (South China)

W. BAERO*, H. BECKER AND U. WIECHERT

Institut für Geologische Wissenschaften, Freie Universität Berlin, Malteserstr. 74-100, 12249 Berlin,
(*correspondence: wbaero@zedat.fu-berlin.de)

Trace element, Sr, C and O isotopic compositions of Ediacaran carbonates are used to assess the likely role of diagenetic processes and alteration by lokal fluid flow, relative to primary seawater derived signatures. The samples are from the slope facies Panmen section (Songtao, Guizhou) of the Yangtze Platform, South China. The section comprises the Ediacaran Doushantuo (DS) and Liuchapo Formations. At this section, carbonate bearing lithologies are restricted to the DS members I (cap carbonates in contact with Marinoan diamictites), III (dolostones and limestones) and IV (organic rich carbonate layers and carbonate concretions in black shales). Most of DS II appears to be missing from this section. Carbonates show variable negative $\delta^{18}\text{O}$ (-6 to -14) and $\delta^{13}\text{C}_{\text{carb}}$ (-2 to -10) values similar to DS I and III sediments at sections representing shallow water conditions. Acetic acid leachets of carbonates display decreasing $^{87}\text{Sr}/^{86}\text{Sr}$ upsection from high and variable values in DS I (0.722-0.717) to lower values in DS III (0.716-0.713). Ce/Ce* are near 1, with a few values significantly higher. The uppermost samples of DS IV show Ce/Ce* = 0.5 at $\delta^{13}\text{C}_{\text{carb}}$ of -1. Some of the extreme values in $\delta^{18}\text{O}$ are coupled with positive Ce (Ce/Ce* = 1.22) and Eu (Eu/Eu* = 1.33) anomalies, and particularly high $^{87}\text{Sr}/^{86}\text{Sr}$. Carbonate concretions in black shales of DS IV have extremely negative $\delta^{18}\text{O}$ but display normal $\delta^{13}\text{C}$, slightly neg. to no Ce/Ce* and strongly pos. Eu/Eu*. $^{87}\text{Sr}/^{86}\text{Sr}$ in the concretions are the lowest measured in the section (0.709), similar to values obtained for DS IV from shallow platform settings [1]. Most $^{87}\text{Sr}/^{86}\text{Sr}$ values of the section are substantially higher than seawater values during this time (0.708-0.709, [1]). High values of $^{87}\text{Sr}/^{86}\text{Sr}$, Ce/Ce* or negative $\delta^{18}\text{O}$ do not correlate with the amount of detrital material in the carbonates. Hence, we interpret high $^{87}\text{Sr}/^{86}\text{Sr}$ and Sr/Mn and the occasional presence of positive Ce anomalies to reflect recrystallization and interaction with reducing fluids that have interacted with silicate and organic material (and occasionally Fe-Mn oxides?) during the postdepositional evolution of the basin. The influence of these processes on $\delta^{13}\text{C}_{\text{carb}}$ is sometimes visible, but appears to be at the 1 ‰ level or less.

[1] Sawaki *et al.* (2010) – *Precamb. Res.* **176**, 46-64.

Fluid-rock interaction during eclogitisation: Evidence from HP metamorphic rocks from Sulawesi, Indonesia

R. BAESE* AND V. SCHENK

SFB 574: Volatiles and Fluids in Subduction Zones, Christian-Albrechts-University, 24118 Kiel, Germany
(*correspondence: rb@min.uni-kiel.de)

Fluid-rock interactions within subduction zones are important for understanding recycling processes and magma generation at convergent margins that is triggered by fluid infiltration from the subducting slab. The aim of this study is to determine the composition of fluids liberated during eclogitisation reactions. The samples are high-pressure (HP) rocks from the Bantimala Complex in Sulawesi (Indonesia) that is part of the Cretaceous accretionary complex distributed all over Indonesia [1]. The eclogites are forming veins and vein networks within blueschists. The peak P-T-conditions are about 2.0-2.5 GPa and 450-550 °C. Trace element analyses of a relatively Cr-rich eclogite-blueschist pair reveal a pronounced depletion of fluid-mobile elements in the eclogite. Mass balance calculations show that the rock lost more than 80% of the REE during the fluid induced eclogitisation along the vein. The LILE (Cs, Ba, Rb, Sr), except K, are also depleted with up to 80%. In case of the HFSE (Pb, Zr, Hf, Ti, Nb) there is no depletion, and Zr, Hf and Ti are even enriched in the vein. Major element concentrations were not strongly affected by the dehydration process during eclogite formation. From these observations we deduce that the fluid produced during the blueschist-to-eclogite transformation in the veins should be enriched in the LILE and REE. The concentrations of the HFSE, Fe and Ni should be relatively low in the fluid, because these elements were incorporated in the vein minerals. These results are in agreement with those of a previous study by John *et al.* [2], who concluded that the mobilised elements during eclogitisation are those believed to be contained in slab fluids that trigger partial melting in the mantle wedge.

[1] Parkinson *et al.* (1998) *The Island Arc* **7**, 184-200. [2] John *et al.* (2008) *Lithos* **103**, 1-24.