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# West Pacific slab subduction-induced carbonate cycle in eastern China during the Early Cretaceous

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West Pacific slab subduction-induced carbonate cycle into the mantle of eastern China has been revealed by the light Mg and heavy Zn-Fe isotope compositions of the <106 Ma-old alkaline basalts above the Big Mantle Wedge (BMW)[1,2], and interaction of carbonated silicate melts with peridotites has been considered as an important mechanism for causing intense lithospheric thinning in eastern China[3]. However, the age (106 Ma) of the oldest basalts with the Mg-Zn-Fe anomalies is significantly younger than the peak age (125 Ma)[4] of the lithospheric thinning and the initial formation age of the BMW (145 Ma)[5] in eastern China. Thus, the intrinsic relationships between carbonate cycle, lithospheric thinning and the BMW formation remain uncertain.

Here we report an early Cretaceous (~123 Ma) diabase in eastern China which is characterized by OIB-type elemental distributions and depleted Nd-Hf isotopic compositions. Comprehensive geochemical data indicate that its mantle source contains recycled oceanic crusts (both basaltic and gabbroic) and terrigenous sediments. Extremely high U/Pb and Th/Pb ratios but unexpectedly unradiogenic Pb isotopic compositions of the diabase suggest that the recycled oceanic crust is young, possibly subducted into the source ~180-250 Ma ago. Such young recycled oceanic crustal components were most likely derived from the west Pacific plate that had initially subducted into the mantle beneath eastern China during the Mesozoic.

Nevertheless, whether there is carbonate component in the mantle source of the diabase remains unknown. Therefore, Mg-Zn-Fe isotope analyses should be carried out for the diabase to address this issue. In addition, the connection between carbonate cycle, the formation time of the BMW and lithospheric thinning during the Early Cretaceous in eastern China will be discussed in the context of west Pacific plate subduction.

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