Temporal and spatial variation of source components for intraplate basalts from North China

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The widespread intraplate small-volume basalts in eastern China provide an excellent opportunity to investigate the temporal and spatial variation of magma source components associated to the ongoing subducted Pacific slab. We measured the H_2O content and oxygen isotopic composition in Chaihe-aershan basalts, NE China. The $\delta^{18}O$ values of cpx phenocrysts (4.27 to 8.57 ‰) and the H_2O contents of magmas (0.23-2.70 wt.%) show large variations. The $\delta^{18}O$ values and H_2O contents within individual sample also display a considerable variation indicating the mixing of magmas. The relationships between the $\delta^{18}O$ values of cpx phenocrysts and the H_2O/Ce, Ba/Th, Nb/La ratios and Eu anomaly of whole-rocks demonstrate the contribution of three components (hydrothermally altered upper oceanic crust or marine sediments, altered lower gabbroic oceanic crust, ambient mantle) in the mantle source. The proportions of these three components vary strongly over time (1.27 Ma to 0.25 Ma). As the Pacific slab is constantly subducted to the eastern Asia, which continuously transport the recycled materials to the mantle, the temporal heterogeneity of source component might be caused by the ongoing Pacific slab subduction. Combined with Shuangliao, Taihang and Shandong basalts in different areas of North China, these results show that the contributions of recycled components from Pacific slab among their mantle source varies widely. This spatial variation of source components is probably directly induced by variable alteration and dehydration events occuring during the recycling progress of the Pacific slab.