# Preservation and modification of the Archean lower crust beneath the western part of the North China Craton

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It has been well doucumented that the eastern part of the North China Craton (NCC) has lost its Archean lithospheric keel, and the thick Archean refractory lithospheric mantle has been replaced by the newly accreted fertile mantle. Mantle xenolith studies also revealed that almost all refracotry lithospheric mantle has been removed though few relics of Archean mantle do survived. In comparison with the overall destruction of the lithospheric mantle, the lower crust, particularly those in the interior of the craton, however, remain intact. Seismic studies and surface heat flow suggest that the western part of the NCC still has a thick cratonic lithosphere and is less affected by the decratonization, which presents a sharp contrast to its eastern counterpart. Is the lower crust beneath the western part of the NCC also intact since its formation in Archean? The lower crustal xenoliths and xenocrysts entrained in kimberlites and volcanic rocks in western NCC provide a key clue to that question. Zircons in granulite xenoliths and the majority of xenocrystic zircons from kimberlites show Archean U-Pb ages with a peak at 2.5Ga. Several xenocrystic zircon grains exhibit late Cretaceous ages suggesting that these kimberlites erupted no earlier than late Cretaceous. As all kimberlites investigated outcrop in the interior of the western NCC, it can be envisaged that the lower crust beneath the interior of the western NCC has been keeping stable since its formation in late Archean. Hower, a suite of granulite xenoliths entrained in late Cretaceous basalts from the northern margin of the western NCC show variable formation ages, apart from those showing late Archean ages, there are also many xenoliths showing phanerozoic ages ranging from 298 to 211 Ma, we interpret these younger ages as crystallization ages of underplated magma at lower crustal depth, Hf isotopic compositions of these younger zircons further support a mantle origin of the melts from which they crystallized. Therefore the conclusion that the interior western NCC still preserves the Archean lower crust, while the lower crust beneath the northern margin has been modified by means of magmatic underplating can be reached. This work was financially supported by NNSFC (91214203).