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Early Cretaceous rolling-back process of the paleo-Pacific slab beneath eastern China: Constraint from age and composition of copper-gold related magmatic rocks

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Copper-gold mineralization in the eastern China highly localized in the interior of the Yangtze craton which is consisted of Precambrian crystalline basement and overlying sedimentary succession. The formation of these copper-gold deposits are closely related to the special Late Mesozoic magmatic rocks with adakitic signature (e.g., Moyen, 2009). Origin of these continental-type adakitic rocks is still controversially discussed and therefore we summarise zircon U-Pb ages, major-trace element and Sr-Nd-Pb isotopes of these adakitic rocks from the Dexing region of Gan-Hang belt on the Jiangnan-Shaoxing fault zone, Edong, Jiu-Rui, Anqing-Guichi and Tongling regions along the lower Yangtze River belt(LYRB). Geochemically, the rocks show similarities to adakites derived from slab melting. Statistical evaluation of existing zircon U-Pb data from the Gan-Hang belt and LYRB reveals a protracted magmatic activities showing from 176 to 156 Ma with peak activity at 170 Ma and from 148 Ma to 106 Ma with peak activity at 139 Ma in LYRB, respectively. Copper-gold related magmatism tends to decrease in age from the Gan-Hang belt in the southwest to the LYRB in the northeast. This trend is consistent with a rolling-back process of the paleo-Pacific plate.

The systematic variation in geochemical and Sr-Nd-Pb isotopic compositions of the copper-gold related adakitic rocks in the Gan-Hang belt and the middle and lower Yangtze River belt point to a component change of magma source with time. The adakitic rocks in eastern China have some features in common with Cenozoic slab-derived adakites, but the socalled continental-type(C-type) adakites may be caused by different levels of melt peridotite interaction and complex crustal material contamination process. AFC model calculation shows that crustal material contamination increased with decreasing crystallization age. Combined with decline of the estimated copper reserves with the decreasing crystallization age, it is concluded that the amount of slab melts should decreased with time and these geological and geochemical variations are consistent with the rolling-back process of the paleo-Pacific subduction(Yang et al., 2014).