

**Early Paleoproterozoic
(2.45~2.2 Ga) magmatic activity
during the period of global
magmatic shutdown:
Implications for crustal
evolution of the southern North
China Craton**

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The database of global zircon ages from both granitoids and detrital sediments have shown an exceptionally and robust gap between 2.45 and 2.2 Ga. This age gap suggests that a widespread reduction of magmatic activity on Earth began at ~2.45 Ga and lasted for 200-250 My (Condie et al., 2009). However, the available data indicated that abundant magmatic activity has occurred in the Taihua Complex in the southern North China Craton (NCC) during this period (Diwu et al., 2014). The Taihua Complex is located in the Lushan and Xiaoqinling areas in the southern NCC, extending in the northwest-southeast direction for over 400 kilometers. It is mainly composed of gneiss series and the khondalite series. The former is composed predominantly of TTG gneisses with minor supracrustal rocks and associated granitic plutons in the Lushan area, which can be delimited at 2.85~2.72 Ga; whereas, a large amount of the 2.45~2.2 Ga TTG gneisses with a peak age at ~2.30 Ga were reported in the Xiaoqinling region. The later, named as Khondalite Belt, is occurred as a linear structural belt along the southern NCC. The khondalite series rocks were formed in a stable continental margin setting, and their depositional age are constrained at a period of 2.30~1.97 Ga. Trace elements characters, Hf isotopes of zircons and whole-rock $\epsilon_{Nd}(t)$ values suggest that those ~2.30 Ga rocks were produced by variable mixing of juvenile melt with older crust as the mantle-derived melt underplated the crust. The 2.45~2.2 Ga magmatic activities in other cratons are mostly considered to be formed in an extensional regime and related to breakup of continent. However, the ~2.30 Ga (2375~2330 Ma) granitoid magmatism in the southern NCC represents the products of continental magmatic arcs, which is interpreted as the result of subduction of an ancient ocean beneath the southern of the NCC.

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