

Subduction-related origin of the 750 Ma Xuelongbao adakitic complex (Sichuan Province, China): implications for the tectonic setting of the giant Neoproterozoic magmatic event in South China

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The Xuelongbao plutonic complex along the eastern margin of the Tibetan Plateau is dated at 748 ± 7 Ma using the SHRIMP zircon U-Pb method and represents part of the Neoproterozoic igneous assemblage of South China. Rocks in the complex include tonalite and granodiorite and have SiO₂ ranging from 62.0 to 74.8 wt% and Al₂O₃ from 14.3 to 20.9 wt%. Their Na₂O contents range from 4.2 to 6.7 wt% and K₂O from 0.47 to 1.96 wt%, indicating that they belong to the Na-series. These rocks show chondrite-normalized REE patterns depleted in HREE and variably enriched in LREE. They have positive Sr and negative Nb and Ti anomalies in the primitive mantle-normalized trace elemental spider diagram. Their Sr contents range from 320 to 780 ppm and Y contents are lower than 10 ppm, resulting in high Sr/Y ratios (52-320), characteristic of typical adakites. Their $\epsilon_{\text{Nd}}(t)$ and initial Sr isotopic compositions range from +0.36 to +2.88 and from 0.7033 to 0.7054, respectively. The geochemical features of the Xuelongbao plutonic complex are consistent with an origin from adakitic magmas that were likely derived from partial melting of a subducted oceanic slab. Together with arc signatures of other granites and mafic intrusions in the region, the 750 Ma Xuelongbao adakitic complex provides evidence for a major, subduction-related Neoproterozoic magmatic event of South China [1-5].

References

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