

Accepted Manuscript

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PII: S1367-9120(17)30020-2
DOI: <http://dx.doi.org/10.1016/j.jseaes.2017.01.020>
Reference: JAES 2938

To appear in: *Journal of Asian Earth Sciences*

Received Date: 19 October 2016
Revised Date: 17 January 2017
Accepted Date: 17 January 2017

Please cite this article as: Li, W., Liu, Y., Jin, W., Neubauer, F., Zhao, Y., Liang, C., Wen, Q., Feng, Z., Li, J., Liu, Q., Syntectonic emplacement of the Triassic biotite-syenogranite intrusions in the Taili area, western Liaoning, NE China: insights from petrogenesis, rheology and geochronology, *Journal of Asian Earth Sciences* (2017), doi: <http://dx.doi.org/10.1016/j.jseaes.2017.01.020>

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Syntectonic emplacement of the Triassic biotite-syenogranite intrusions in the Taili area, western Liaoning, NE China: insights from petrogenesis, rheology and geochronology

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Abstract:

The North China Craton (NCC) is one of the oldest cratons in the world, and it recently becomes a hot study area because of large volumes of Mesozoic intrusions associated with lithospheric thinning contributing to cratonic destruction in late Mesozoic times. However, the timing of initial thinning and destruction is still controversial. The Taili area, western Liaoning Province, in the northeastern part of the NCC well exposes the Archean basement rocks and the Mesozoic magmatic rocks with variable plastic deformation. This study focuses on the syntectonic emplacement of the Triassic biotite-syenogranite intrusions, in order to understand their petrogenesis, timing as well as the geological significance. Zircon LA-ICP-MS U-Pb ages reveal that the biotite-syenogranites formed between 246 and 191 Ma, and contain many ancient (2564–2317 Ma) zircon xenocrysts. Geochemical data suggests that the biotite-syenogranites display an adakitic affinity with high Sr/Y = 135–167 and $(La/Yb)_N = 48–69$, as well as negligible Eu anomalies ($\delta Eu = 0.87–0.94$), high negative zircon $\epsilon Hf(t)$ values (-15.5 to -21.5) and ancient T_{DM2} ages (2246–2598 Ma). This data suggests that the parent magmas were generated from

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