

Age for the oldest crown-group salamanders

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Although abundant crown-salamanders have been reported from North America, Russia, Central and East Asia, the early diversification and evolutionary history of salamanders are unclear [1, 2]. Since the early 21st century, thousands of exceptionally well-preserved salamander specimens have been discovered from Jurassic-Cretaceous terrestrial formations in Inner Mongolia, Hebei Province and Liaoning Province, northeastern China [2, 3]. These Chinese fossils provide key information on the life histories and developmental patterns of early crown-group salamanders. Based on stratigraphic correlations, salamander-bearing strata in Daohugou and Reshuitang Villages are probably older than elsewhere. Previous age study indicate the Daohugou fossil bed is ~161.5 Ma [4] and the absolute age for the Reshuitang fossil bed is dubious. In this study, we collected one ash sample right above the fossil bed in the Reshuitang outcrop. Our ⁴⁰Ar/³⁹Ar age of 161.6 ± 0.6 Ma for sanidines from this sample provides the first reliable age determination for Reshuitang salamanders. Our study indicates salamander-rich strata in Daohugou and Reshuitang were deposited contemporaneously and both localities host the oldest crown-group salamanders. Furthermore, our high-precision age establishes a consistent chronostratigraphic model for correlating fossil-rich horizons in northeastern China and provides robust geochronological calibration for salamander evolution.

[1] Gao & Shubin (2001) *Nature* **410**, 574-577. [2] Gao & Shubin (2003) *Nature* **422**, 424-428. [3] Gao et al. (2013) *Canadian Journal of Earth Sciences* **50**, 255-267. [4] He et al. (2004) *Geophysical Research Letters* **31**, L20609.