

Implications of U-Pb zircon CA ID-TIMS ages for high-resolution stratigraphy and timescale of Jurassic-Cretaceous continental strata of northern China

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We have sampled a series of predominately airfall ashes in both cores and outcrops of the largely continental facies in the Fuxin-Yixian-Jinzhou Basin, the Beipiao Basin, the Kazuo-Chaoyang Basin; the Lingyuan Basin, and the Jixi Basin of northern China. The goal, through high-resolution U-Pb geochronology, is to place these continental facies in a tight and independent timescale that will provide constraints for development of astrochronologies and for the evolution of continental ecosystems (notable for their exceptional preservation of feathered non-avian dinosaurs) and to refine the geological timescale in general. Sampled formations from which we have obtained results include the Jurassic Jiulongshan and Haifanggou formations, the Early Cretaceous Tuchengzi, Yixian, and Jiufotang formations, and the median Cretaceous Chengzihe and Mulin formations. We have surveyed zircons from ashes using LA-ICPMS followed by CA-ID-TIMS on select crystals, constituting the first use of the latter technique on these strata. Results indicate broad agreement with previously published U-Pb ages but more discrepancy with ⁴⁰Ar/³⁹Ar ages. The new zircon dates permit significant revision of existing and development of new astrochronologies from continuous core and outcrop (notably for the Jiulongshan, Tuchengzi, and Yixian formations), detailed sequencing of biotas from disjunct geographic locations, and much tighter constraints on the duration of strata.

This work was supported by the National Natural Science Foundation of China (91114201) and the National Basic Research Program of China (973 Program 2012CB821906). This is a contribution to UNESCO-IUGS IGCP Project 632.