

Calibration of the early Triassic biotic recovery: new U/Pb zircon ages from South China

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Calibration of the Early Triassic biotic recovery is presently only constrained by two zircon ages obtained for the Permian-Triassic boundary (252.6 ± 0.2 Ma, Mundil et al., 2004) and the Anisian-Ladinian boundary (≈ 241 Ma, Mundil et al. 1996, Palfy et al. 2003). The respective durations of the four Early Triassic stages (Griesbachian, Dienerian, Smithian, Spathian) and of the Anisian remain to be established. Preliminary new zircon ages obtained from ash beds intercalated with ammonoid faunas in the Luolo Fm (Early Triassic) and the overlying Baifeng Fm. (Anisian) in northwestern Guangxi (South China) lead to first estimates of the durations of the Spathian and of the Anisian.

Zircons were dated by precise isotope-dilution U-Pb techniques of mechanically abraded single-grains. In the upper carbonate unit of the Luolo Fm., zircons from the lower ash bed (basal Spathian) yield a crystallization age of 250.7 Ma, whereas those from the upper ash bed (Haugi Zone, latest Spathian) yield an age of 247.1 Ma. Zircons from an ash bed at the very base of the Baifeng Fm. (early Anisian) point to an approximate age of 246.4 Ma. Increased precision will be achieved by applying annealing-leaching procedures.

Hence, the Spathian/Anisian boundary is bracketed between 247.1 Ma and 246.4 Ma, which leads to a duration of the Early Triassic comprised between 5.5 and 6.2 my if adopting a P/T boundary age of 252.6 Ma. As the duration of the Spathian is no less than 3.6 my, this stage accounts for at least half of the duration of the Early Triassic. The duration of the Anisian is comprised between 5.4 my and 6.1 my when taking a 241 Ma Anisian/Ladinian boundary. Our new age constraints highlight the very high recovery rate of ammonoids whose diversity first peaked during the Spathien.

References

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