Lucas, S.G. and Spielmann, J.A., eds., 2007, The Global Triassic. New Mexico Museum of Natural History and Science Bulletin 41.

EARLY TRIASSIC TIMESCALE AND NEW U-PB AGES FROM SOUTH CHINA: FIRST CALIBRATION OF THE EARLY TRIASSIC CARBON CYCLE PERTURBATIONS

THOMAS GALFETTI[1], HUGO BUCHER[1], MARIA OVTCHAROVA[2], URS SCHALTEGGER[2], ARNAUD BRAYARD[3], THOMAS BRÜHWILER[1], NICOLAS GOUDEMAND[1], HELMUT WEISSERT[4], PETER A. HOCHULI[1], FABRICE CORDEY[3] AND KUANG GUODUN[5]

[1] Paläontologisches Institut der Universität Zürich, Karl Schmid-Strasse 4, 8006 Zürich, Switzerland,
email: galfetti@pim.uzh.ch, hugo.FR.bucher@pim.uzh.ch, bruehwiler@pim.uzh.ch, goudemand@pim.uzh.ch, peter.hochuli@erdw.ethz.ch;
[2] Department of Mineralogy, University of Geneva, rue des Maraîchers 13, CH-1205 Geneva, Switzerland,
email: maria.ovtcharova@terre.unige.ch, urs.schaltegger@terre.unige.ch;
[3] UMR 5125 PEPS CNRS, Université Lyon I, Campus de la Doua, 69622 Villeurbanne Cedex, France,
email: arnaud.brayard@univ-lyon1.fr, Fabrice.Cordey@univ-lyon1.fr;
[4] Department of Earth Science, ETH, Sonneggstrasse 5, 8006 Zürich, Switzerland, email: helmut.weissert@erdw.ethz.ch;
[5] Guangxi Bureau of Geology and Mineral Resources, Jiangzheng Road 1, 530023 Nanning, China

Crucial for carbon cycle modeling and for the interpretation of carbon isotope shifts is a precise time framework based on the calibration of high-resolution ammonoid zones with high-precision radiometric ages. The outer platform, ammonoid- and conodont-rich, mixed carbonate-siliciclastic series of the Early Triassic Luolou Fm. (NW Guangxi, South China) contains a succession of volcanic ash layers. Among these, high precision U-Pb ages on zircons of two late Early Triassic (i.e., Spathian) ash layers were proposed by Ovtcharova et al. (2006). Taking a Permian-Triassic boundary age of 252.6 ± 0.2 Ma (Mundil et al., 2004), the recalculated uncertainties of these ages now indicate a minimal duration of 2.7 ± 0.7 My for the Spathian, thus confirming that it represents about half of the duration of the entire Early Triassic.

A new U-Pb age of 251.22 ± 0.20 Ma is proposed for an ash layer associated with the early Smithian "*Kashmirites densistriatus* beds" of the Luolou Fm. This new date, together with recalculated uncertainties of previous Spathian U-Pb ages (Ovtcharova et al., 2006) allow narrowing down of the absolute duration of the Griesbachian-Dienerian interval as well as the duration of the Smithian substage, which are estimated to be ca. 1.4 ± 0.4 My and to ca. 0.7 ± 0.6 My, respectively.

This new age model provides the fundamental basis for the calibration of a new high-resolution carbonate carbon isotope and ammonoid records of the Early Triassic Luolou Fm., which in turn are seen as essential for global correlations and for future carbon cycle modeling studies. This calibration indicates that the most significant and fastest Early Triassic carbon isotope perturbations occur between the early Smithian and the early Spathian, thus spanning a time interval of about 1 My.

REFERENCES

Mundil, R., Ludwig, K. R., Metcalfe, I., Renne, P. R., 2004. Age and Timing of the Permian Mass Extinctions: U/Pb Dating of Closed-System Zircons. Science 305, 1760-1763.

Ovtcharova, M., Bucher, H., Schaltegger, U., Galfetti, T., Brayard, A., Guex, J., 2006. New Early to Middle Triassic U-Pb ages from South China: Calibration with ammonoid biochronozones and implications for the timing of the Triassic biotic recovery. Earth and Planetary Science Letters 243, 463-475.