The *Daptocephalus* Assemblage Zone (Lopingian), South Africa: A proposed biostratigraphy based on a new compilation of stratigraphic ranges

Pia A. Viglietti1, Roger M. H. Smith1,2, Kenneth D. Angielczyk1,3, Christian F. Kammerer1,4, Jörg Fröbisch1,5, Bruce S. Rubidge1

1Evolutionary Studies Institute, School for Geosciences, University of the Witwatersrand, Johannesburg, Private Bag 3 Wits 2050, pia.viglietti@gmail.com, bruce.rubidge@wits.ac.za.

2 Iziko South African Museum, P.O. Box 61, Cape Town, 8000 South Africa, rsmith@iziko.org.za.

3 Integrative Research Center, Field Museum of Natural History, 1400 South Lake Shore Drive, Chicago, Illinois, 60605, USA, kangielczyk@fieldmuseum.org

4 Museum für Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin, Invalidenstraße 43, 10115, Berlin Germany, christian.kammerer@mfn-berlin.de.

5 Institut für Biologie, Humboldt-Universität zu Berlin Invalidenstraße 110, 10115 Berlin, Germany, joerg.froebisch@mfn-berlin.de.

The *Dicynodon* Assemblage Zone (DiAZ) of South Africa’s Karoo Basin is one of the eight biostratigraphic zones of the Beaufort Group. It spans the uppermost Permian strata (Balfour, Teekloof, and Normandien formations) and traditionally has been considered to terminate with the disappearance of *Dicynodon lacerticeps* at the Permo-Triassic Boundary. We demonstrate that the three index fossils currently used to define the *Dicynodon* Assemblage Zone (*Dicynodon lacerticeps*, *Theriognathus microps*, and *Procynosuchus delaharpeae*) have first appearance datums (FADs) below its traditionally recognized lower boundary and have ranges mostly restricted to the lower portion of the biozone, well below the Permo-Triassic Boundary [1].

We propose re-establishing the revived *Daptocephalus leoniceps* [2] as an index fossil for this stratigraphic interval, and reinstating the name *Daptocephalus* Assemblage Zone (DaAZ) for this unit. Furthermore, the appearance of *Lystrosaurus maccaigi* in the uppermost reaches of the biozone calls for the establishment of a two-fold subdivision of the current *Dicynodon* Assemblage Zone. The biostratigraphic utility of *Da. leoniceps* and other South African dicynodontoids outside of the Karoo Basin is limited due to basinal endemism at the species level and varying temporal ranges of dicynodontoids globally. Therefore, we recommend their use only for correlation within the Karoo Basin at this time.

Revision of the stratigraphic ranges of all late Permian tetrapods does not reveal a significant change in faunal diversity between the lower and upper DaAZ. However, the last appearance datums of the abundant taxa *Di. lacerticeps*, *T. microps*, *P. delaharpeae*, and *Dictodon feliceps* occur below the three extinction phases associated with the end-Permian mass extinction event [3]. Due to northward thinning of the strata however, the extinction phases may not be fully represented in this part of the basin.

References:

