

New early Permian tetrapod fauna from Namibia

**Claudia Marsicano^{1*}, Roger M.H. Smith^{2,3}, Adriana Mancuso⁴,
Helke Mocke⁵, Fernando Abdala^{2,6}, Leandro Gaetano^{1,2}**

¹Departamento de Cs. Geológicas, Universidad de Buenos Aires, Buenos Aires, Argentina

²Evolutionary Studies Institute, University of the Witwatersrand, Johannesburg, South Africa

³Department of Karoo Palaeontology, Research and Exhibitions, Iziko South African Museum, Cape Town, South Africa

⁴Ianigla, CCT-CONICET-Mendoza, Mendoza, Argentina

⁵National Earth Science Museum, Geological Survey of Namibia, Windhoek, Namibia

⁶Unidad Ejecutora Lillo, CONICET, Tucumán, Argentina

*E-mail: clamar@gl.fcen.uba.ar

The earliest tetrapods in Western Gondwana are the mesosaurs, a group of specialized endemic aquatic parareptiles known only from Artinskian strata of Namibia, South Africa, Uruguay, and Brazil. Recent finds from early Permian beds in northern Brazil revealed a new freshwater fauna from tropical Gondwana. However, it was not until the Guadalupian (middle Permian) that diverse temnospondyl amphibian and amniote faunas became widespread across south-central Gondwana. A new source of evidence lies in the Carboniferous-Permian continental strata from the Huab Basin (Tsarabis, Huab and Gai-As formations) of northwestern Namibia. These strata have yielded scattered tetrapod remains (temnospondyls, *Mesosaurus*) reported several years ago. The Gai-As Formation was deposited in a freshwater rift valley lake at approximately 60°S palaeolatitude. The lake opened westwards into the Parana Basin and eastwards it was closed off by river deltas. It is in this transition between aquatic and terrestrial environments that most of the fossils are preserved. To date, we have collected 75 fossils of mainly fishes (actinopterygian and chondrichthyan) and temnospondyl amphibians from a single lower Gai-As locality just above the *Mesosaurus*-bearing levels. Absolute zircon dates from ash beds in the upper Gai-As (265.5 ± 2.2 Ma), and the underlying *Mesosaurus*-bearing beds (270 ± 1 Ma) constrain the new fauna to the Roadian. At least three different temnospondyl taxa are represented by partial remains of a long-snouted form, and a short-snouted (parabolic) one with a highly vaulted skull-roof. The third taxon, which includes near-complete large (3 m long) skeletons, presents character states that place it in the edopoid clade, a basal temnospondyl group only previously known from the Carboniferous-early Permian of Euroamerica and the uppermost Permian of Niger. These include exclusion of the vomers and palatines from the interpterygoid vacuities, which themselves are relatively small and taper strongly anteriorly, and the presence of intertemporal ossification in the skull table. This new Namibian fauna that lived in and around saline to brackish water lakes and fjords, helps to fill a crucial c. 10 Ma gap in the fossil record of tetrapods in the southern hemisphere and presents a previously unknown radiation of Laurasian lineages into the region during the Roadian.

A new approach to *Glossopteris* leaf taxonomy: embracing morphometric analyses

Aviwe Matiwane^{1,2*}, Rose Prevec^{1,2}

¹Department of Botany, Rhodes University, Grahamstown, South Africa

²Department of Earth Sciences, Albany Museum, Grahamstown, South Africa

*E-mail: aviwematiwane0@gmail.com

Glossopteris leaves are one of the most common and easily recognized Permian fossils across Gondwana, but they are morphologically conservative and taxonomic approaches to species differentiation have been varied, relying on visual estimations of relatively plastic characteristics such as shape, length, etc. Species identification in the past has therefore proven to be subjective, inconsistent and extremely challenging. To address these taxonomic challenges, we have produced the first morphometric study