New skeleton from the early Oligocene of Germany indicates a stem-group position of diomedeoidid birds

Vanesa L. De Pietri, Jean-Pierre Berger, Claudius Pirkenseer, Laureline Scherler, and Gerald Mayr

We report a new specimen of the extinct procellariiform species *Diomedeoides brodkorbi* (Aves, Diomedeoididae) from the early Oligocene (Rupelian) of Rheinweiler in southwestern Germany. The well-preserved partial skeleton allows the recognition and reassessment of new osteological details that bear on the phylogenetic affinities of diomedeoidids. The presence on the coracoid of a deeply excavated, cup-like facies articularis for the scapula suggests a stem group position of the Diomedeoididae within Procellariiformes, because this trait also occurs in stem-group representatives of several avian groups, as well as in Mesozoic non-neornithine birds, and is a plesiomorphic character. We hypothesize that the similarities of *Diomedeoides* to extant southern storm-petrels (Oceanitinae), such as the long mandibular symphysis, the small processus supracondylaris dorsalis and the long legs are plesiomorphic for Procellariiformes.

**Key words:** Aves, Diomedeoididae, phylogeny, stem-group, Oligocene, Rupelian, Upper Rhine Graben, Germany.

Vanesa L. De Pietri [vanesa.depietri@nmbe.ch], Naturhistorisches Museum der Buergergemeinde Bern, Bernastrasse 15, CH-3005 Bern, Switzerland; Jean-Pierre Berger [jean-pierre.berger@unifr.ch], Claudius Pirkenseer [claudiusmarius.pirkenseer@unifr.ch], and Laureline Scherler [laureline.scherler@unifr.ch], Dept. Geosciences-Earth Sciences, Chemin du Musée 6, University Fribourg, CH-1700 Fribourg, Switzerland; Gerald Mayr [Gerald.Mayr@senckenberg.de], Forschungsinstitut Senckenberg, Sektion Ornithologie, Senckenberganlage 25, 60325 Frankfurt am Main, Germany.

This is an open-access article distributed under the terms of the Creative Commons Attribution License (for details please see creativecommons.org), which permits unrestricted use,
distribution, and reproduction in any medium, provided the original author and source are credited.