Title: The Unitary Association method in biochronology and its potential stratigraphic power between benthic and planktic organisms: A case study on foraminifers from Paleocene–Eocene strata of southern Egypt

Author: Ahmed A. Abdelhady Barbara Seuss Mostafa H. El-Dawy Nageh A. Obaidalla Kamel H. Mahfouz Samar A.A. Hussien

PII: S0016-6995(17)30112-2
DOI: https://doi.org/doi:10.1016/j.geobios.2018.06.005
Reference: GEOBIO 830

To appear in: *Geobios*

Received date: 3-7-2017
Accepted date: 25-6-2018

Please cite this article as: Abdelhady, A.A., Seuss, B., El-Dawy, M.H., Obaidalla, N.A., Mahfouz, K.H., Hussien, S.A.A.,The Unitary Association method in biochronology and its potential stratigraphic power between benthic and planktic organisms: A case study on foraminifers from PaleocenendashEocene strata of southern Egypt, *Geobios* (2018), https://doi.org/10.1016/j.geobios.2018.06.005

The Unitary Association method in biochronology and its potential stratigraphic power between benthic and planktic organisms: A case study on foraminifers from Paleocene–Eocene strata of southern Egypt ✡

Ahmed A. Abdelhady [a,*], Barbara Seuss [b], Mostafa H. El-Dawy [a], Nageh A. Obaidalla [c], Kamel H. Mahfouz [d], Samar A. A. Hussien [a]

[a] Geology Department, Faculty of Science, Minia University, 61519 El-Minia, Egypt

[b] Friedrich-Alexander-University, GeoZentrum Nordbayern - Paleobiology Section, Loewenichstraße 28, 91054 Erlangen, Germany

[c] Geology Department, Faculty of Science, Assiut University, Egypt

[d] Geology Department, Faculty of Science, Al-Azhar University, Assiut, Egypt

* Corresponding author. E-mail address: alhady2003@mu.edu.eg (A. Abdelhady).

✡ Corresponding editor: Claude Monnet.

Abstract

Although foraminifers have been extensively used for biochronology, no quantitative evaluation of the quality of their application is available. In this work we apply a quantitative approach – the Unitary Association (UA) method – to evaluate the relative quality of planktic and benthic foraminifers in biostratigraphy. Based on 12,321 specimens belonging to 65 planktic and 132 benthic foraminifer species in 117 samples from the Paleocene–Eocene strata of the Kharga-Baris Oases (Western Desert, Egypt), the potential stratigraphic resolution power of benthic foraminifers is quantitatively assessed and compared to planktic foraminifers. The UA method accounts for superpositional contradictions between sets of coexisting taxa and generates unitary associations, which are conceptually similar to Oppel zones. The analysis produced fifteen unitary associations for the Paleocene–Eocene benthic Foraminifera of the studied sections, instead of three classical zones; most of these unitary