



ELSEVIER

Palaeogeography, Palaeoclimatology, Palaeoecology 201 (2003) 179–181

PALAEO

www.elsevier.com/locate/palaeo

Short Note

Towards a guide to palaeobiogeographic classification

F. Cecca^{a,*}, G.E.G. Westermann^b

^a *Université Pierre et Marie Curie, Paris VI, Laboratoire de Micropaléontologie, case 104, 4 place Jussieu, F-75252 Paris Cedex 05, France*

^b *School of Geography and Geology, McMaster University, Hamilton, ON, Canada L8S 4M1*

Received 6 March 2003; accepted 17 July 2003

Abstract

The present paper is a report of work completed by the group ‘Friends of Paleobiogeography’ on the principles of palaeobiogeographic classification and nomenclature of palaeobiogeographic units (biochoremas). These principles are intended to complement those of neobiogeography and are aimed at enhancing palaeobiogeography in general by a simplified and standardised terminology.

© 2003 Elsevier B.V. All rights reserved.

Keywords: palaeobiogeography; Palaeobiogeographic Unit; biochore; Biochorema

1. Introduction

In 1995, Westermann formed the International Group ‘Friends of Paleobiogeography’ in order to solve the current problems of classification and nomenclature in (marine) palaeobiogeography. An extensive questionnaire was circulated among the ‘Friends’ in March 1997 and the replies, together with a historical review and suggestions, were published in this journal (Westermann, 2000).

A consensus on principles of classification and nomenclature of biogeographic units or biochores (‘Group of similar biotopes, the largest division of animal and plant environments’ according to the Oxford English Dictionary) was expressed by a

sample of palaeobiogeographers. Four basic recommendations were suggested (Westermann, 2000):

(1) *Definition of biochores:* a biochore should be defined by the overall endemism of its biota (not particular taxa) within a geographic envelope around a core area. Biochore boundaries are defined by the temporary range limits of the constituent taxa.

(2) *Ranks (or tiers) of biogeographic units:* Realm, Subrealm (optional), Province, Subprovince (optional). The term ‘region’ should be used informally rather than as a substitute for Subrealm. Russian authors use an additional rank, variably named Kingdom, Superrealm or Belt, at the top end of the classification. The term Superrealm is now accepted.

(3) *Biochores as dynamic units:* they change in range (areal extent) and rank through time; some may disappear during mass-extinction and major geotectonic or eustatic events. The shifting of the

* Corresponding author. Fax: +33-1-44-273831.

E-mail addresses: cecca@ccr.jussieu.fr (F. Cecca), wadej@mcmaster.ca (G.E.G. Westermann).

boundary between the Boreal and Tethyan Realms in the Jurassic provides an example of such a biochore change.

(4) *Biochore nomenclature*: names are geographic/geologic, not taxonomic. Priority ‘rules’ of synonymy and homonymy should be applied to biochore names, not rigorously but with common sense.

In June 2001, on the occasion of the Open Meeting of Friends of Paleobiogeography, in the framework of the Symposium ‘Paleobiogeography and Paleoecology 2001’, Castell’Arquato (Italy), a discussion on Westermann’s recommendations took place. While some of these recommendations were approved by those present, the opinions of absent ‘Friends’ were needed. A further ballot was organised and the final conclusions are here summarised. Cecca took over the leadership of ‘Friends of Paleobiogeography’ from Westermann.

2. Present status

(1) The terms Biogeographic Unit and Biochorema (see below) can be used interchangeably.

Biogeographic Units/Biochoremata are defined as dynamic units that change in range and rank through time. They are based on the overall endemism of biotas.

In Cecca’s (2002) recent textbook the term ‘biochore’ is used because the book was in press while the ballot was still open.

(2) The ranks are the following: (Superrealm), Realm, Subrealm or Region, Province and Subprovince. The term *Region*, not recommended by Westermann (2000), is being re-introduced as an alternative to subrealm particularly for terrestrial biogeography.

Ranking is according to endemism, duration and range.

(3) The terms *type area* (or type region) and type age respectively replace the terms chorotype and chronotype originally used by Westermann (2000). Chorotype was pre-occupied and chronotype is replaced by analogy.

(4) The nomenclature of Biogeographic Units/Biochoremata should follow the following guidelines: names should be geographic or geologic,

not taxonomic. Synonymy and homonymy apply to all ranks, with priority from 1911, the publication year of Uhlig’s seminal work on Jurassic and Cretaceous marine palaeobiogeography. The long misuse of names may serve to invalidate them.

To provide nomenclature stability, names may only change at extreme change in distributional range or composition of biotas, or significant plate movements.

3. Notes

Biochorema instead of Biochore – During the Meeting in Castell’Arquato Werner E. Piller (University of Graz, Austria) recorded the previous uses of ‘biochore’ in ecology and phytogeography. The use of ‘biochore’ in a floristic sense by Dan-sereau (1957) predates that by the Russian (palaeo)-biogeographical school (see Makridin, 1973), endorsed by Westermann (2000).

Piller’s remarks stimulated a proposal by M. Manceñido (‘Friends of Paleobiogeography’, circular of 25 October 2001) to transform the term Biochore in *Biochorema* by introducing a minimal change, yet respecting the etymological roots originally intended. According to Brown’s ‘Composition of Scientific Words’ (1956), in Greek, ‘*chorema*’ [neuter] is a valid alternative to ‘*chora*’ [fem.] or ‘*choros*’ [masc.] denoting the broad related meanings of ‘place, space, room, land or district’. Bearing in mind that ‘biochorion’ (based on a Greek diminutive) is already in use with other meaning since 1963, Manceñido adopted ‘Biochorema’ (Manceñido, 2002) because it has the advantage of being neutral, euphonious and unambiguous. It may be viewed as a mere amendment or improvement to avoid confusion, retaining the intellectual priority of the concept from its proposal by Russian authors.

Manceñido’s proposal was adopted after a ballot.

References

- Brown, R.W., 1956 (reprinted 1991). *Composition of Scientific Words*. Smithsonian Institution Press, Washington, DC, 882 pp.

- Cecca, F., 2002. Palaeobiogeography of marine fossil invertebrates: Concepts and methods. Taylor and Francis, London, 271 pp.
- Dansereau, P., 1957. Biogeography: An Ecological and Evolutionary Approach, 4th ed. Blackwell, Oxford, 244 pp.
- Makridin, V.P., 1973. The principles of discrimination and nomenclature of subdivisions in the paleozoogeographic zoning of marine basins. *Paleontol. J.* 1973, 127–131.
- Manceñido, M., 2002. Paleobiogeography of Mesozoic brachiopod faunas from Andean–Patagonian areas in a global context. *Geobios mém. Spéc.* 24, 176–192.
- Uhlig, V., 1911. Die marinen Reiche des Jura und der Unterkreide. *Mitt. Geol. Ges. Wien* 4, 229–448.
- Westermann, G.E.G., 2000. Biochore classification and nomenclature in paleobiogeography: An attempt at order. *Palaeogeogr. Palaeoclimatol. Palaeoecol.* 158, 1–13.