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Introduction to thematic set of papers on the Ediacaran–Cambrian palaeoecology, sedimentology and stratigraphy of Namibia

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The Neoproterozoic was a time of profound biological and geological change. After a long time of very modest changes in the flora and fauna, the Ediacaran period finally brought forward the first diverse microflora, the first diverse macrophytes, as well as the first diverse macroscopic organisms, some of which likely are animals. There were significant palaeogeographic changes, at least two, or probably three, pronounced levels of widely recorded glaciations, and extensive fluctuations in δ^{13} C. Much thought has recently been directed at understanding if, and how, several, or most, of these events are related.

One area of the world that has contributed significantly to Ediacaran research is Namibia. In northern Namibia, the Otavi Group encompasses several late Proterozoic glacial intervals. The youngest of these is represented by the Ghaub Formation, which includes facies (cap carbonates) and radiometric ages (*c*. 635 Ma; Hoffmann *et al*. 2004) that suggest it corresponds to the base of the recently defined Ediacaran period. The cap carbonates of northern Namibia have been extensively discussed in the context of their origin and genetic and temporal relation to severe glaciations (see Shields, 2005).

In southern Namibia, the Nama Group yields diverse types of information on the later parts of the Ediacaran and earliest Cambrian. The Nama Group comprises more than 3 km of shallow marine to fluvial sedimentary strata deposited in a foreland basin. It benefits from excellent exposure and a relatively uncomplicated geological setting, as well as the presence of siliciclastic as well as carbonate sedimentary rocks. Further fortunate features are numerous ash beds which have enabled precise dating and show that deposition took place from about 550 Ma. Much of the framework for the sedimentology and stratigraphy of the Nama Group in southern Namibia is due to the impressive efforts of Gerard Germs (e.g. Germs, 1983, 1995), who also discovered and described many important fossils and who is the 'father' of the weakly biomineralized tubular fossil *Cloudina* (Germs, 1972). In recent years the understanding of the Nama Group has in particular benefited from the work of people who are or were at MIT, notably John Grotzinger and Beverly Saylor. This includes the integration of sequence stratigraphic and chemostratigraphic data with geochronology and biostratigraphy leading to a singularly well-defined succession (e.g. Grotzinger *et al*. 1995; Saylor *et al*. 1998). Detailed sedimentological work has enabled the recognition of a variety of facies (e.g. Germs, 1983; Saylor, 2003). In common with many other Ediacaran localities one can note the presence of structures that have been interpreted as evidence for extensive binding of the sediment by microbial mats (e.g., Noffke, Knoll & Grotzinger, 2002).

There is a low diversity of Ediacara-type fossils in Namibia and of these only a few are moderately numerous. The most well known are *Ernietta* and *Pteridinium* which are among the more hard-to-fathom forms of the Ediacaran menagerie (Grazhdankin & Seilacher, 2002).

In addition to *Cloudina*, other weakly biomineralized organisms have been recovered (Grotzinger, Watters & Knoll, 2000; Wood, Grotzinger & Dickson, 2002). It has been noted that the assemblage of fossils found in the Nama Group has greatest similarity with areas such as the Great Basin/Mojave desert of western USA and that these may represent a younger assemblage than the more diverse ones of, say, South Australia (Waggoner, 2003). Exactly which part of the signal is due to evolutionary aspects and which part is due to environmental or geographic influences remains a topic of interest (Grazhdankin, 2004).

Though much is known about the Ediacaran of Namibia, much clearly remains to discover and document in such a vast area, and it was with this in mind we invited papers to provide a broad synthesis of current work on the area. We thank all the authors for their contributions and feel confident that this collection of papers presents significant new data and will stimulate further work on the stratigraphy, sedimentology and palaeontology of this critical region.

References

Germs, G. J. B. 1972. New shelly fossils from the Nama Group, South West Africa. *American Journal of Science* **272**, 752–61.

GERMS, G. J. B. 1983. Implications of a sedimentary facies and depositional environmental analysis of the Nama Group in South West Africa/Nambia. In *Evolution of the Damara Orogen of South West Africa/Namibia* (ed. R. M. Miller), pp. 89–114. Geological Society of South Africa, Special Publication no. 11.

GERMS, G. J. B. 1995. The Neoproterozoic of southwestern Africa, with emphasis on platform stratigraphy and paleontology. *Precambrian Research* **73**, 137–51.

GRAZHDANKIN, D. 2004. Patterns of distribution in the Ediacaran biotas: facies versus biogeography and evolution. *Paleobiology* **30**, 203–21.

GRAZHDANKIN, D. & SEILACHER, A. 2002. Underground Vendobionta from Namibia. *Palaeontology* **45**, 57–78.

GROTZINGER, J. P., BOWRING, S. A., SAYLOR, B. Z. & KAUFMAN, A. J. 1995. Biostratigraphic and geochronologic constraints on early animal evolution. *Science* **270**, 598–604.

GROTZINGER, J. P., WATTERS, W. & KNOLL, A. H. 2000. Calcified metazoans in thrombolite-stromatolite reefs of the terminal Proterozoic Nama Group, Namibia. *Paleobiology* **26**, 334–59.

HOFFMANN, K.-H., CONDON, D. J., BOWRING, S. A. & CROWLEY, J. L. 2004. U–Pb zircon date from the Neoproterozoic Ghaub Formation, Namibia: constraints on Marinoan glaciation. *Geology* **32**, 817–20.

NOFFKE, N., KNOLL, A. H. & GROTZINGER, J. P. 2002. Sedimentary controls on the formation and preservation of microbial mats in siliciclastic deposits: a case study from the Upper Neoproterozoic Nama Group, Namibia. *Palaios* **17**, 533–44.

SAYLOR, B. Z. 2003. Sequence stratigraphy and carbonate-siliciclastic mixing in a terminal Proterozoic foreland basin, Urusis Formation, Nama Group, Namibia. *Journal of Sedimentary Research* **73**, 264–79.

SAYLOR, B. Z., KAUFMAN, A. J., GROTZINGER, J. P. & URBAN, F. 1998. A composite reference section for terminal Proterozoic strata of Southern Namibia. *Journal of Sedimentary Research* **68**, 1223–35.

SHIELDS, G. A. 2005. Neoproterozoic cap carbonates: a critical appraisal of existing models and the *plumeworld* hypothesis. *Terra Nova* **17**, 299–310.

WAGGONER, B. 2003. The Ediacaran biota in space and time. *Integrative and Comparative Biology* **32**, 104–13.

WOOD, R. A., GROTZINGER, J. P. & DICKSON, J. A. D. 2002. Proterozoic modular metazoan from the Nama Group, Namibia. *Science* **296**, 2383–6.