Report: Introducing the Namibian Committee for Stratigraphy

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Abstract :- Geological and geoscientific research has been carried out in Namibia for well over a hundred years ever since the earliest colonial days. Enormous advances in science and technology during this period of time have led to a rather heterogenous data set, compiled from maps of greatly varying vintage and detail. Up to the time of Namibian independence in 1990, the South African Committee for Stratigraphy (SACS) included the geology of Namibia within its framework, but since then geological research in the country has been ongoing without the benefit of an overseeing agency to regulate activities, set standards and incorporate new results into a consistent and unambiguous stratigraphic data base. For these reasons it was deemed desirable to establish a Namibian Committee for Stratigraphy.

Keywords :- Stratigraphy, Data management

To cite this report :- Schreiber, U., Kapuka, E., Nduutepo, A. & Nguno, A. 2023. Introducing the Namibian Committee for Stratigraphy. *Communications of the Geological Survey of Namibia*, **26**, 98-101.

Background

With its multi-faceted geology, encompassing rocks and semi- to unconsolidated deposits from the Archaean to Cenozoic and spanning more than 2.5 billion years of earth history, Namibia has attracted geoscientists, both from academia and natural resource exploration since the late 1800s. During this time, a mass of information of vastly different vintage, accuracy and state of knowledge has accumulated in the archives of the Geological Survey of Namibia (GSN) and among the pages of international scientific literature. However, at present there is no formal framework guiding researchers from home and abroad with respect to stratigraphic nomenclature and hierarchy. This lack of guidelines has repeatedly led to conflicts such as identical names accorded to different stratigraphic units or disparate names assigned to the same one (Table 1) – a situation creating problems not only for stratigraphic integrity, but also for the compilation of geological maps, which is one of the core functions of GSN.

One of the first concerted efforts towards unravelling the existing information and modern data management was the conception of a "map library", containing descriptive attributes of lithostratigraphic units from the entire country that could be linked to spatial information in a GIS environment. This project, started in the early 1990s in co-operation with the Finnish Geological Survey, provided the basis for an index of almost 1000 formal to semi-formal stratigraphic and tectonostratigraphic units up to 2020. In addition to the primary hierarchical and descriptive attributes, it also contains synonyms/obsolete names, original reference and type locality, if known. It is to expand this index and resolve existing conflicts, as well as to institute formal procedures for the introduction of new stratigraphic units / names and to promote common standards in stratigraphic nomenclature, that the Geological Survey of Namibia decided to form a national Committee for Stratigraphy similar to its South African counterpart, in 2021.

The Namibian Committee for Stratigraphy (NACS)

The initiative to establish NACS rested with the Regional Geoscience Division of GSN, as the custodian of geological information in charge of map production and maintenance of the "map data base", with its initial Secretariat / Executive Committee re-

Synonym/old name	Name	Status	Age	Reference	Remarks
Bergfriede, Nuremberg, Husab	Karibib	Formation	Ediacaran	SACS (1980)	
Karibib Formation	Bergfriede	Formation	Ediacaran	Clifford (1962; 1967; 2007)	Local name (Fransfontein Ridge)
Karibib Formation	Nuremberg	Member	Ediacaran	Clifford (1962; 1967)	Local name (Okonguarri Antiform)
Karibib Formation	Husab	Formation	Ediacaran	Jacob (1974)	Local name (southern Central Zone)
Lower Omao Formation	Beesvlakte	Formation	Tonian	Hoffman and Halverson (2008)	
Beesvlakte Formation	Lower Omao	Formation	Tonian	Woodhead (2007)	Study by Colorado School of Mines
Upper Omao Formation	Okakuyu	Formation	Tonian	Hoffman and Halverson (2008)	
Upper Omao Formation	Devede	Formation	Tonian	Hoffman and Halverson (2008)	
Okakuyu & Devede Formations	Upper Omao	Formation	Tonian	Woodhead (2007)	Study by Colorado School of Mines
Huab Formation	Rhino Wash	Formation	Permian	Miller (2008)	Renamed because of Huab MC
	Huab	Formation	Permian	Ledendecker (1992)	Obsolete
	Huab	Metamorphic complex	Palaeoproterozoic	Huab MC	
Approved names in red ("Reference" refers to entries in the "Name" column)					

Table 1. Examples for naming ambiguities past and present

cruited from present and past members of the division. It was decided that to be effective and to attain official and legal status, NACS should be registered as part of the National Spatial Data Infrastructure (NSDI) framework of the Namibian Statistics Agency (NSA), which regulates data standards and provides guidelines for data capture, presentation and distribution.

Local and international experts, whose long-term work in Namibia - often spanning decades - qualifies them to guide NACS/GSN in streamlining their efforts to achieve an unambiguous stratigraphic data base, were requested to join the committee and participate in its activities. With positive responses received from most of the selected candidates, NACS currently has 25 members from Namibia (12), South Africa (3), Canada (1), Germany (3), France (1), Brazil (1), Australia (1), Norway (1) and the United Kingdom (2). Further specialists may be invited as permanent or advisory members, if additional expertise is required in the execution of the committee's duties.

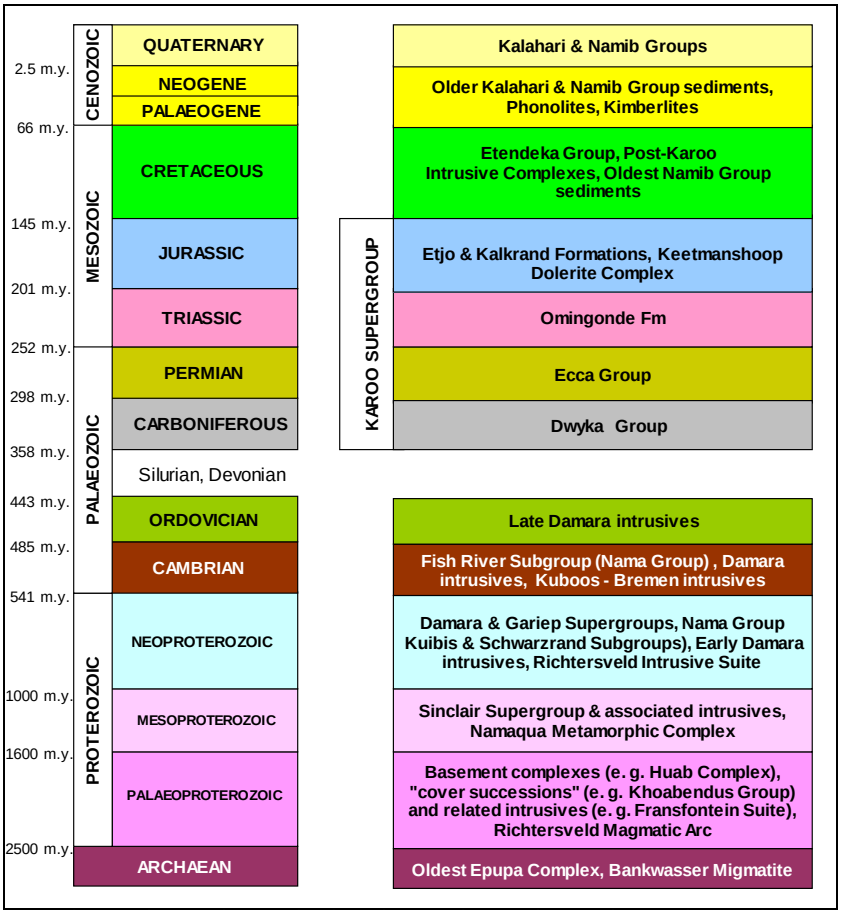

Table 2. Schematic stratigraphic column of Namibia

Aims and Objectives

A first meeting to discuss aims and expectations of the committee as well as general matters such as communication channels, was held in October 2022, with nine members of the committee and secretariat present on site at the Geological Survey's boardroom in Windhoek, and eight connected by means of an online service. Due to other commitments, it was almost a year until a follow-up session was scheduled at the Mercure Conference Centre in Windhoek in September 2023, during the 29th Colloquium of African Geology. At this meeting 13 secretariat and committee members were present, while six asked to be excused.

Committee members were requested to form three main working groups based on their expertise, i. e. "Pre-Damara" (Archaean to Mesoproterozoic), "Damara" (Neoproterozoic to Early Cambrian) and "Post-Damara" (Late Cambrian to Cenozoic), as the Pan-African Damara Orogen and related features form a conspicuous central part of Namibia's geological landscape (Table 2). Working groups may be further subdivided into specialty groups - if warranted by the number of participants - at the unanimous decision of their members. Terms of reference outlining the structure and respective duties of the secretariat, executive committee and working groups will be published separately in this journal, and on appropriate official platforms.

The first task of the above working groups will be to make recommendations towards the resolution of existing ambiguities in the stratigraphic nomenclature, and to formulate procedures and requirements for the introduction and naming of new stratigraphic/intrusive units in accordance with international standards, under consideration of specific Namibian conditions. A proposal should contain at least the following

- Reason for proposal
- Proposed name
- Description of unit
- Stratigraphic affiliation/relationship
- Type of contact(s)
- Type locality (with coordinate)
- Type section
- Geochemical and/or petrographic characterisation
- Geochronological analysis (igneous rocks)

but may also include other information as required by circumstance (e. g. fossil content). Proposals should be submitted to the NACS secretariat, which will publish the executive committee's decision in the GSN's in-house journal "*Communications of the Geological Survey of Namibia*"; the establishment of a NACS website is also being considered as a means of information exchange and to disseminate news items. In this way it is hoped to avoid future naming and related conflicts as outlined above (Table 1), which are difficult to eradicate once they have become established in the literature. International scientists, who are required to be in possession of a research permit when conducting field work in Namibia, are confidently expected to welcome this initiative, and support NACS in achieving its objectives by adopting the proposed procedure.

In addition to these immediate tasks to tie up loose ends and develop a consistent, unequivocal stratigraphic database, a number of long-term objectives of the committee and its workings groups were raised at the above meetings. Looming large among these is the appositeness of employing formal stratigraphic terms (e. g. formation, member), which by ICS (International Committee on Stratigraphy) standards require the definition of mappable upper and lower boundaries, in high-grade metamorphic and / or structurally complex terrains. In the past various solutions have been applied to this problem, such as the introduction of an "informal unit" (Geological Survey of Namibia map data base) or the use of small instead of capital letters to indicate the informal status (e. g. Möwe Bay formation; Miller, 2008). Following a review of various options (in the form of stratigraphic codes employed by other countries), the committee proposes to make such adjustments to the current stratigraphic data base as are deemed necessary to record new research and mapping results accurately, but otherwise retain the existing nomenclature and structure until such time as new work produces fresh insights and justifies a review of the established terminology.

All existing stratigraphic documentation in the form of tables (e. g. Table 3), indexes and papers, will be shared with committee members and is also available to the public on request. As contribution by the Regional Geoscience Division of GSN, which will continue in close co-operation with NACS, it is planned to compile brief descriptions / summaries of all stratigraphic and intrusive units for reference purposes, and to regularly update GSN's geochronological database from new publications, as well as to obtain fresh dates on stratigraphic key units providing the availability of funds.

Reference:

Miller, R.McG. 2008. Neoproterozoic and Early Palaeozoic rocks of the Damara Orogen. *In*: Miller, R.McG. (Ed.). *The Geology of Namibia*, Vol. **2**, chapter 13, 410 pp. Geological Society of Namibia, Windhoek.

SEDIMENTARY AND VOLCANIC ROCKS			INTRUSIVE ROCKS		
Group	**Formation**	**Member**	**Suite**	**Intrusive unit**	
KONKIEP	Aubures				
				Sonntag Granite	Post-Guperas
	Guperas				
				Rooikam Granite	Post-Barby – pre-Guperas
				Nubib Granite (incl. Verweg Granite)	
			Chowachasib		
				Awasib Granite	
				Bushman Hill Quartz Diorite	
			Haisib		
			Saffier		
				Kumbis Gabbro	
	Eensam*				
	Zwartmodder*				
	Keerweder*				
	Welverdiend				
	Haiber Flats				
	Barby	Aruab			
	Kunjas				
				Tumuab Granite	Pre-Barby
				Haremub Granite	
				Kotzérus Granite	
				Okarus Granite Porphyry	
	Nagatis				
				Neuhof Granite	Post-Kairab – pre-Nagatis
				Hauchab(fontein) Granodiorite	
				Shangri La Diorite	
				Hammerstein Tonalite	
			Neisip River	Klein Tiras Granite	
				Houmoed Granodiorite	
				Tiras Gneiss	
				Tierkloof Diorite	
			Diar 9		
				Aunis Tonalite	
				Neuhof Reserve Amphibolite*	
				Mooirivier Granite*	
				Witwater Granite Gneiss*	
	Kairab	Mooirivier gneiss**			

*local name (position uncertain, probably equivalent with Welverdiend Fm)

** informal unit (formerly part of Moorivier Metamorphic Complex)

Table 3. Stratigraphy of the Konkiep Group (Sinclair Supergroup) and related intrusives as an example for stratigraphic tables to be compiled for each major geological unit by GSN/NACS