

Code of stratigraphical nomenclature for Norway.

Preface.

The present code of stratigraphical nomenclature has been accepted by the Commission on Stratigraphy of Norway and is based on a draught by G. Henningsmoen submitted to the Norwegian Committee on Stratigraphical Nomenclature. The code has been adopted by the Geological Survey of Norway.

The brief statements on stratigraphical terminology should be regarded as preliminary, awaiting an eventual international agreement.

Brief remarks on stratigraphical terminology.

Stratigraphical units are bodies of strata (rocks or sediments) which differ from the surrounding strata in physical properties (*e.g.* lithology or fossil content) or in age. Formal stratigraphical units are those which have been given a formal name.

One may distinguish between three kinds of stratigraphical classification; lithostratigraphical classification with units based on lithology, biostratigraphical classification with units based on fossil content, and chronostratigraphical classification with units representing a certain time interval. The chronostratigraphical boundaries are time boundaries (ideally time-levels, in practice often time-belts), whereas litho- and biostratigraphical units have boundaries determined by respectively lithology and fossil content.

Lithostratigraphical units are (with decreasing rank): suite or complex (Norw. *suite, kompleks*), group (*gruppe*), formation (*formasjon*), and member (*ledd* or *subformasjon*). There is at present no internationally accepted term for the highest category, but "suite" and "complex" have been proposed, as well as other terms like "super-group" and "bloc".

Biostratigraphical units have boundaries determined by the distribution of one or more index fossils and are the bodies of strata contain-

ning the index fossil(s). Such units are termed zones and subzones, but is has been proposed to call them zonites and subzonites to distinguish them from the chronostratigraphical zones and subzones.

Chronostratigraphical units are (with decreasing rang): system (Norw. *system*), series (*serie*), stage (*etasje*), zone (*son*) or substage (*subetasje*), and subzone (*subson*). The boundaries of systems, series, and stages are based primarily on lithological or palaeontological boundaries in a type section. The boundaries of zones and subzones primarily are based on palaeontological boundaries, whereas those of substages primarily are based on lithological boundaries. There is at present no international agreement on whether the term zone (and not only the term substage) should be used for this category of chronostratigraphical units. This, however, appears to agree with common practice in Europe and is recommended here awaiting an international agreement. The term chronozone has been proposed for a chronostratigraphical zone.

The Norwegian Cambro-Silurian "*Etasjer*" and their subdivisions (with symbols 1, 2a, 3c β , 4a α , a. o.) may be regarded as chronostratigraphical units (series, stages, zones and substages, and subzones). Their boundaries are based on boundaries of local stratigraphical (topostratigraphical) units in the Oslo region. Some of the latter boundaries are based on lithological data, others on palaeontological data.

Stratigraphical names.

1. Formal stratigraphical names are such as Mellsenn Formation, Horg Series, and Zone of *Parabolina spinulosa* (or *Parabolina spinulosa* Zone). The names consist of two parts, a general part (Formation, Series, Zone) and a special part, which generally is a geographical name or the name of a fossil.

Many lithostratigraphical units have names of the type Vik Shale, which may be regarded as an abbreviation of Vik Shale Formation or Vik Shale Member. There are also names of the type Upper, Middle, or Lower Vik Shale. In a name of the type Upper Vik Shale (Formation), "Upper Vik" is the special part and "Shale (Formation)" the general part of the name.

2. Lithostratigraphical units should be named after a type area or type locality (as e.g. Biri Limestone or Mellsenn Formation). Some lithostratigraphical units have been given names like Quarts Sandstone

or Calcareous Sandstone (= Calcareous Sandstone Formation). Such names do not agree with international practice and should be avoided, but symbols like RP_2 (= RP_2 Formation) may be retained.

Biostratigraphical units (zones or zonites and subzones or sub-zonites) shall be named after one or more fossils.

With regards to chronostratigraphical units, the international names are used for systems (Cambrian, Ordovician, etc.). International names may also be used for series (*e.g.* Tremadoc Series, Wenlock Series) when correlation allows it, or one may use local names (Ringerike Series, Chasmops Series *a. o.*). Series should preferably be named after a place, but in Norway many series have long ago been named after a fossil. Stages should be named after places or fossils, in the latter case they should originally be founded on palaeontological data. Sub-stages, which are based on lithological data, should be named after the type area or type locality. Zones and subzones are based on palaeontological data and should be named after one or more fossils (*e.g.* Zone of *Parabolina spinulosa*).

3. The author of a stratigraphical name is the one who first publishes it as a formal name, and the date of the publication is considered as the date of erection of the name and its date of priority.

4. If informal names of the type Vik beds, Vik sequence, and Vik horizon have been used as if they were formal names, they may be considered as formal names and be referred to as *e.g.* Vik Formation. As author is generally regarded the one who first published the informal name. Cases of doubt may be settled by the Norwegian Committee on Stratigraphical Nomenclature (NCSN).

5. Two or more stratigraphical units cannot have the same name. If two or more units nevertheless have been given the same name (are homonymous), the name shall, as a rule, adhere to the earliest established unit. Exceptions from this rule may be declared valid by the NCSN.

A unit named *e.g.* Vik Shale (Formation) is regarded as having a different name from another unit called Vik Sandstone (Formation). It is, however, advised against using the same geographical name for two or more stratigraphical units, except in cases where *e.g.* the Vik Shale (Formation) is divided into an Upper Vik Shale (Member), a (middle) Vik Limestone (Member), and a Lower Vik Shale (Member).

6. If the same stratigraphical unit has been given two or more different names, the earliest name as a rule shall be the valid name.

Exceptions may be validated by the NCSN (*i.a.* if the earliest name is an unfortunate choice or has been little in use). The invalid names are synonyms, which are of significance only in that other stratigraphical units shall not be given the same names.

7. If the category of a stratigraphical unit is changed (*e.g.* from formation to group or from member to formation), the name retains its original author and priority.

8. If the upper or lower boundary of a stratigraphical unit is moved significantly, one should give a new name to the unit rather than to change the concept of the earlier name.

9. All nouns in stratigraphical names shall be capitalized, except specific fossil names when combined with a generic name (*e.g.* Parabolina spinulosa Zone, not Parabolina Spinulosa Zone, but Spinulosa Zone). Lower, Middle, and Upper are capitalized when they are parts of formal stratigraphical names.

The spelling of terms in the general part of stratigraphical names shall be in accordance with present orthography.

Geographical names used in stratigraphical names shall be spelt according to the orthography at the time of its erection. Exceptions may be declared valid by the NCSN. The geographical name in a stratigraphical name shall generally be given in nominative singularis and in its indefinite form, although many geographical names in Norway are commonly used in their definite form (with the postfixes -a, -an, -ane -en, -ene, -et, and -i). Thus a Norddal Formation may be named after Norddalen, Storøy Formation after Storøya, Utskjær Formation after Utskjæret, and Blåfjell Formation after Blåfjella.

10. Valid Norwegian stratigraphical names are those declared valid by the Norwegian Committee on Stratigraphical Nomenclature. Generally, a new stratigraphical name automatically becomes valid if it has been erected according to the rules of this Committee.

Establishment of formal stratigraphical units.

When formally establishing a stratigraphical unit, one shall:

1. Give it a name according to the rules of NCSN and give the reasons for applying this name to the unit, and, if necessary, give the derivation of the name.
2. Designate a type area or preferably a type section.

3. State whether the unit is a litho-, chrono-, or biostratigraphical unit and state its category (formation, series, zone, member, etc.)
4. State the distinctive characters of the unit and give as much as possible of the following information (or refer to publications with this information): General description of the unit (lithology, fossil content, variations, etc.), age, thickness, how its boundaries are defined, relation to associated units, geographical distribution, main outcrops, and topographical appearance.