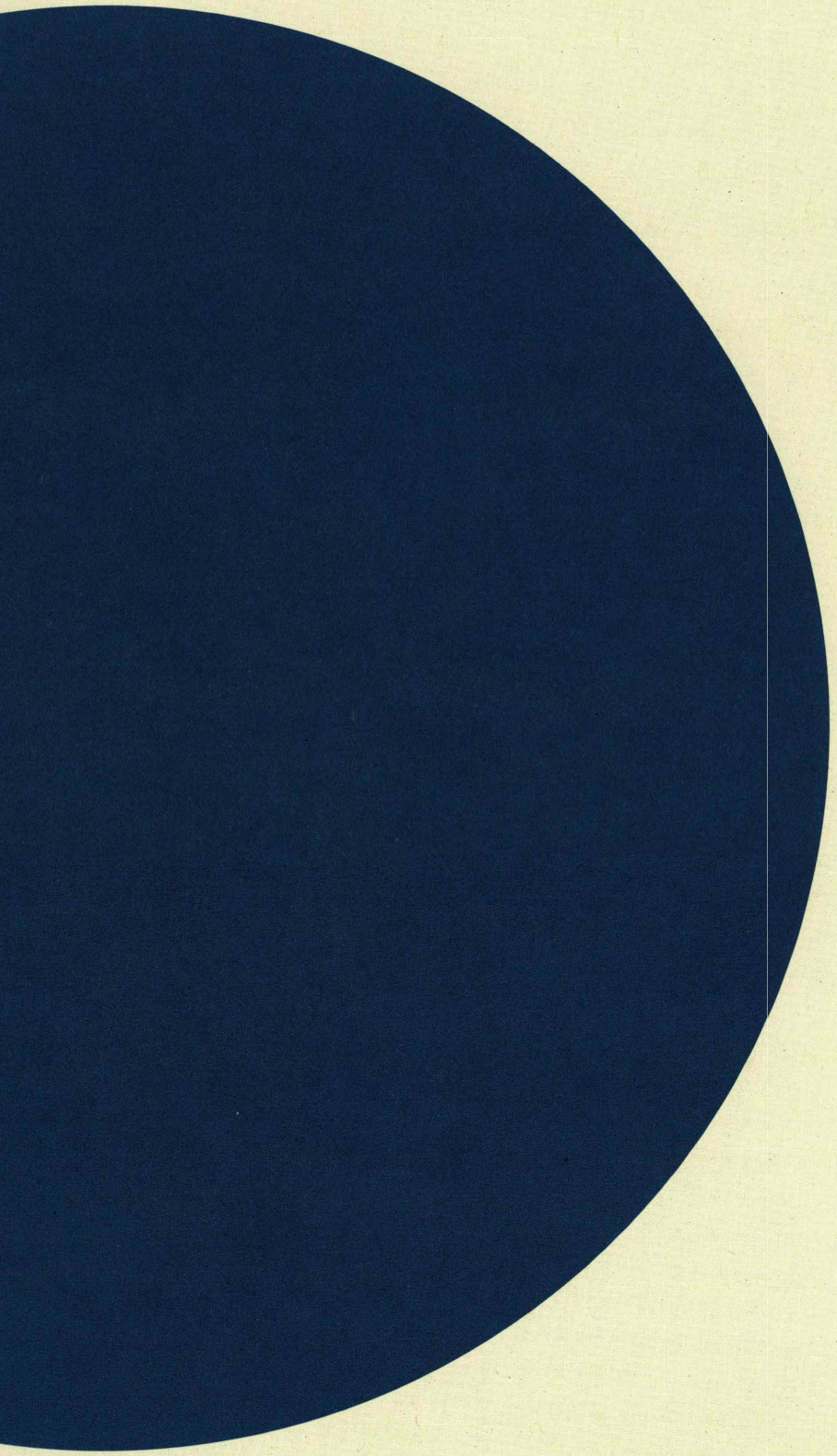
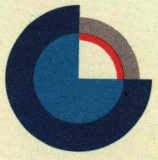
DANMARKS OG GRØNLANDS GEOLOGISKE UNDERSØGELSE RAPPORT 1998/71

Publishing in the scientific series of the Geological Survey of Denmark and Greenland: a handbook for authors and editors

Peter R. Dawes and Esben W. Glendal



GEOLOGICAL SURVEY OF DENMARK AND GREENLAND
MINISTRY OF ENVIRONMENT AND ENERGY



GEUS

DANMARKS OG GRØNLANDS GEOLOGISKE UNDERSØGELSE RAPPORT 1998/71

Publishing in the scientific series of the Geological Survey of Denmark and Greenland: a handbook for authors and editors

Peter R. Dawes and Esben W. Glendal

Publications Committee: Report No. 5

GEOLOGICAL SURVEY OF DENMARK AND GREENLAND
MINISTRY OF ENVIRONMENT AND ENERGY

GEUS

Preface

The standard of GEUS publications is the foremost mark of the esteem and professionalism with which our institution deserves to be held. Presentation is an important part of the standard.

The responsibility for the Survey's international scientific series lies with a publications committee, assisted by an editorial secretary. The members of the committee are all research scientists involved in editing part-time. If GEUS is to publish at international standards in English regularly, the onus is clearly on authors (in effect, on departments) to prepare manuscripts that not only meet international scientific standards but are also of comparable technical quality.

The end-product of scientific research is not just the published account; it is the reader's understanding of the intended messages. Transfer of information is the basic reason for scientific publication; effective writing and clear presentation are paramount. To meet this, professional associations and scientific publishing houses, academic institutions and editors' organisations have established standards for scientific publishing. It is precisely through scientific style and standard nomenclature that unstructured texts and questionable terminology – that lead to difficult reading and misunderstandings – can be avoided. Too rigid style and strict control of language are undesirable; they lead to sterile text and lack of individuality.

This handbook deals with the basics: forget pedantry and perfectionism. It is designed to help authors prepare manuscripts in GEUS style and to ensure editorial consistency. In the long run, it is a contribution to increased efficiency at GEUS in scientific writing. In the short term, preparing a manuscript after GEUS standards will minimise the time it takes to publish; manuscripts that do not follow 'in-house' style will be returned to the author. A positive frame of mind of authors (and departments) towards manuscript preparation and any changes requested by editors is a key to minimising publication time.

Peter R. Dawes

Chairman
Publications committee
(Publikationsudvalget)

Please note that a 4-page "Author instructions for the scientific series ....." based on this report and suitable for external authors, is available from the editorial office.

Contents

The aim of this handbook

Like all professional publishing houses, geological surveys have set publication procedures and standards. This report is not of the simple 'Instructions to authors' type known from periodicals. GEUS is both an authorial and a publishing house; the preparation of manuscripts by authors is just one side of scientific publishing. This handbook is for all those involved in the publication production: authors with secretarial, graphic and photographic support, as well as editors and production staff. It has an index to realise its reference function.

Effective publishing at international level demands structured teamwork. The interaction between author and editor is important since the combined skills of both are necessary to produce a scientific publication at international level. In a new institute like GEUS, it is vital that all follow the same procedures and aim for the same standards, and that there is clear understanding between those producing manuscripts and the editorial and production staff whose job it is to get them published.

This handbook provides the background for this understanding by serving as an instruction manual to authors and editors alike – in English to reach our international colleagues – and by describing the publication system at GEUS. This is an important aspect since the system differs from the way scientific publications were organised at DGU and GGU.

The handbook concerns publishing of text manuscripts in traditional printed form; naturally the same principles of writing apply to electronic issues. Its size may suggest to some that we are aiming for perfectionism; in fact, while quality is an important goal, this handbook simply relates to *elementary* aspects of scientific writing and manuscript preparation.

For the preparation of maps the reader is referred to *Geology of Denmark and Greenland Map Series* in Dawes & Glendal (1997) and to the scientific editors of this series.

The main text of this report is in six parts.

Part 1. Outlines some general aspects of the GEUS scientific publications, introduces the central theme of the handbook (information transfer – help the reader), offers tips in scientific writing and summarises the main points in a 'code of ethics'.

Part 2. Describes the publication system at GEUS and the main stages involved in manuscript flow from the pre-submission stage to printing.

Part 3. Gives the details of manuscript preparation in GEUS style and describes the main elements of a typescript.

Part 4. Outlines the standards for illustrations and tables in GEUS format, including the preparation of diskettes.

Part 5. Contains information on international codes and systematics with special reference to stratigraphy, palaeontology and structural geology.

Part 6. Deals with some aspects of English language usage, including punctuation, use of italic text, abbreviations, symbols and units of measure.

Part 1. Guidelines, principles and standards

Guidelines to the scientific series

Information about the GEUS scientific series, i.e. *Geology of Denmark Survey Bulletin*, *Geology of Greenland Survey Bulletin* and *Geology of Denmark and Greenland Map Series,* is contained in three reports of which this handbook is the third. The two previously released reports are:

1. *Publications in English of the Geological Survey of Denmark and Greenland: the scientific series and other issues* (Dawes & Glendal 1997) outlines general publication policy and practice, with information on editing and production responsibilities. It describes the complete range of GEUS publications in print (in English). The report emphasises the distinction between the scientific series, which are peer reviewed and edited centrally, and publications produced departmentally.

2. *A standard bibliographic style for GEUS' publications: a guide for authors and editors* (Sønderholm *et al.* 1998) outlines the reference style that came into force in January, 1998. Standards and tips for referencing in the text are given. References are split into the eight categories relevant for the production of reference lists by the computer programme EndNote. An easy-to-use catalogue of all publication types of DGU, GGU and GEUS written in GEUS style, concludes the report.

The central theme: help the reader

The theme of this handbook is 'information transfer – help the reader' or in other words, don't leave the reader guessing about any factual aspect of your prose or illustrations. If you have decided to present results for the GEUS scientific series, you have also made the decision that they are worthy of an international audience. The subject of information transfer should be foremost in your mind. Some authors – including seniors with a long publication record – will reflect that obvious things are not worth saying; yet, the manuscripts already presented to the GEUS scientific series demonstrate conclusively that this message cannot be overstated.

Simply, *write for the reader*, strive to be clear and concise and avoid any chance of misunderstanding. Don't expect the international reader to know your inner thoughts or all pertinent details of your work or study area. Guide the reader into and through the subject.

Remember that all relevant local knowledge needs explaining.

For example, it shouldn't be taken for granted that international readers know which land area is Denmark, which are Sweden and Norway. Or more specifically, where Jutland, Copenhagen or the North Sea are located, or that Bornholm is a Danish island in the Baltic Sea.

The basic dozen: a check list for authors and editors

Typical examples from GEUS manuscripts that do not honour the principles of 'information transfer' are listed below. They form a basic check list for authors and editors.

1. Illustrations without scale.
2. Illustrations lacking or without complete explanatory legends.
3. Geographical areas and relevant place names not shown on a map.
4. Maps without geographical orientation.
5. Ambiguous or incorrect placing of geological or place names on illustrations.
6. Data sources cited in the text but not in the reference list.
7. Quotations from cited works without page identifications.
8. Misleading, inaccurate or inadequate reference sources.
9. Inconsistencies, including the use of various names or terms for one thing or the same name for different things.
10. Local names or terms used without explanation.
11. Unfamiliar abbreviations that are undecipherable.
12. No initials for cited persons (the name Jensen is hardly internationally informative).

Books on scientific writing and publishing

This handbook does not pretend to cover even most aspects of standards, manuscript preparation and editing. There is an extensive literature on scientific writing, style and publishing, and in many works – both those before and after the electronic revolution – there is a call for clear and honest communication in scientific writing. Some titles speak for themselves (e.g. Bates 1988); some books are specifically written for geologists (e.g. Glover 1992; Bates *et al.* 1995), while others report on ethics and the growing misconduct in scientific publishing (e.g. LaFollette 1992; Resnik 1998). There are many books on editing of scientific texts, both scientific/substance editing and copy/technical editing (e.g. Butcher 1993; Council of Biology Editors 1994).

Some authors point to the urgent need for universities to teach more about the art of scientific writing arguing that the current dismal standard of reporting is "seriously affecting the quality of our science" (Irvine & Rumble 1992, p. 2). Perhaps the call for better writing has never been more relevant than now. In the 'publish or perish' age where the publication list is all important for grants and survival, it can be argued that in the momentum to publish, less attention is paid to accuracy and clarity. At least texts that give the impression of being bashed out willy-nilly are easy to find. And, of course, wherever emphasis is placed on quantity rather than quality, substandard texts will thrive.

All parts of a manuscript have equal rights

In joint-authored works it is sometimes clear 'who has written what'. In some cases this adds welcome individuality to a text. But papers can suffer from the uneven attention given to all parts. The clearest example is where *prefaces, abstracts and conclusions* – that can be the last sections to be written – bear clear signs of nonchalant 'let's get finished' writing.

This is a great pity since these items are often the most read parts of a paper (see under 'Abstract', p. 26). These items should *always* be critically read by colleagues with the main text; surprising perhaps, but often they aren't.

Adverse sides of word processing

Electronic word processing has revolutionised scientific writing but there are adverse sides. It is argued that the general standard of scientific writing has deteriorated because of it (Irvine & Rumble 1992). Could young scientists be deluding themselves through their own desk-top publishing units that since their electronically prepared manuscripts with integrated illustrations look good, they will pass as being so?

More specifically, the ease at which text blocks can be moved around is a sure invitation to disjunctive writing, and requests to reduce a manuscript's length have never been easier to accommodate by prompt use of the delete key. But the fundamental aim remains the same: smooth logical prose, free from ambiguity, and without repetition. The shortening of paragraphs by rephrasing rather than by slashing should not be a skill of a bygone age.

Writing and rewriting: author and editor roles

Writing is essential for research; rewriting is part and parcel of scientific writing. There is an astute statement somewhere in the literature (can't just trace it) that says that there is no such thing as 'good writing', only 'good rewriting'. Writing, rewriting and drafting of illustrations are an important part of research; it is often through this phase that scientific arguments become clear and logical; well-formulated texts are the products of reviewing, revising and reworking.

It is the author's responsibility to submit well-prepared texts; it is the editor's responsibility to ensure that the texts meet the required scientific and technical standards. The practise of bashing off a text, with a great rush to get into print, can contain a calculated play with reviewers and editors as the work-horses. This is to be deplored. Honest request for help will always be honoured but reviewers and editors should never be confronted with babel, unless of course co-authorship is offered!

The GEUS code of ethics for scientific publication

A concise and illustrative way of drawing attention to some of the more important points in scientific writing is achieved here in the form of a *Code of ethics*. This has been improved by the adoption of a phrase or two from Donnay (1995).

1. Authorship means responsibility; co-authorship still means responsibility.
There is no respite for authors when faced with critique; all authors have equal responsibility for contents. "I never agreed to that" has no value. Don't be a joint author if you haven't checked the contents.

2. Write clearly; be precise; aim for unknown readers not yourself or co-workers.
The running theme of this handbook is 'help the reader'. Writing for an international audience demands an outward-looking technique that is quite different from writing a 'project report'.

3. Strive for the truth; separate fact from fiction; report honestly; don't mislead.
The urge to create a good story by selective reporting is not science but politics; always recognise fact from speculation and be categorical about it. Report accurately and logically; conclude courageously.

4. Check each paragraph; remove ambiguities; rework text with colleageal help.
Few authors have the gift of writing clearly at first penning. Ambiguities and incorrect or misleading statements can often only be seen with colleageal help. Rewriting is an essential part of scientific writing.

5. Give credit where credit is due; don't plagiarise; avoid self-esteem.
A vital part of scientific writing is the citation of relevant data sources. Plagiarism is the stealing of results and ideas of others; citation of own papers with omission of more relevant ones is also degenerate.

6. State sources accurately; check references conscientiously.
Bibliographic references are cited in full for one reason: so that the reader is equipped to recover the original information. It is paramount that they are accurate; it is the author's responsibility to assure it.

7. Computers have no scientific integrity; check all print-outs.
As print-outs take over the role of definitive documents, the tendency to treat computers with heavenly status should be questioned. Print-outs contain blunders; it is the author's responsibilty to correct.

8. Computer drawings also need qualified input; reuse easily means misuse.
Electronic graphics make reuse easy, e.g. cropping and modification of maps are routine. Geological insight and caution are paramount if correspondence is to be ensured between new version and legend.

9. Indifferent use of illustrative material without credit is plagiarism; avoid it.
Illustrations, tables, etc. are integral parts of a paper; apply the same scholarly etiquette to them as to the text. Any derivation from another work, wholly, in part, or in modified form demands acknowledgement.

10. Exercise individual responsibility; don't expect others to clean up your work.
Authors alone have responsibility for the work submitted. Pressure of work and reliance on others are no excuse for sloppy presentation, omissions or misleading text. Editors are not co-authors.

11. Accept justified criticism gracefully; suppress disappointment; let reason decide.
It takes time and effort to review a paper *properly*; authors who instantly shun constructive comments are discrediting science at the expense of their pride. Luckily, later, common sense usually prevails.

12. Revision may mean fundamental reappraisal; let logic decide.
Judge each critique point objectively; accept the authority of logical argument but in the quest of truth, question arguments based on authority. Authoritative and in vogue views can be wrong.

The scientific series

The three scientific series are not the most frequent publications of the Survey. However, they are the most prestigious, representing, along with the peer-review papers published in external outlets, the scientific merit of the Survey. The series are edited along the same lines as international publications, with authors having to take stock of external reviews.

The reader is referred to Dawes & Glendal (1997) for a systematic description of the three scientific series.

Geology of Denmark Survey Bulletin and *Geology of Greenland Survey Bulletin*

The two bulletin series issue authoritative works on research dealing with all aspects of geology in Denmark, Greenland and the Faeroe Islands, including offshore areas, as well as comparable conditions in, or relations to, neighbouring countries. Single- or multi-article volumes are produced. There is no maximum text limit, but one volume is normally composed of at least 40 printed pages.

Geology of Denmark and Greenland Map Series

This series presents all types of printed geoscientific maps from the three countries, accompanied by a descriptive text of maximum 16 printed pages. The text of the *Map Series* should be considered as explanatory notes – a sort of expanded legend – naturally with scientific interpretation.

Economic geology

In standard descriptions of geological maps, one section in the Map Series text is obligatory. This is a section on the economic geology of the map area. This applies even though the economic potential is thought to be poor. In some thematic maps, such a section may not be relevant.

Map versus Map Series: dates and priority

Ideally, the map and explanatory notes should be published together, i.e. both with the same year of publication. However, in most cases the map will be printed prior to its inclusion in the *Map Series*, and consequently it will bear an earlier date. This date is usually used as year of issue as maps are *normally* released for distribution immediately; as such the year of issue becomes the publication date. In some cases there may be many years' lapse between the printing of the map and its issue in the *Map Series*. During this time there can have been important changes in factual knowledge of the map area.

It is important to stress that in such cases the explanatory notes must still focus on describing the contents of the map as compiled. At the same time, it is equally important that new

mapping and research since publication of the map are clearly stated, enabling the reader to assess progress in factual information and interpretations.

Do not just describe an old map in modern terminology, start by using the terminology of the map; if rock units are indicated on the map by symbols or letters, use the same identifications in the descriptive text.

In cases where the text of the *Map Series* deals with an earlier released map it is important to uphold the principle of priority, viz. that named geological units can only be introduced into the literature once. The map has publication priority. Thus, geological names given on the map released in 1994 cannot be proposed several years later; they can be described, redescribed, revised, redefined, but not proposed or erected.

Reference to DGU, GGU and GEUS

GEUS is an independent research and consultancy institution under the Danish Ministry of Environment and Energy. The survey was established in 1888. Standing alone this statement is ambiguous and misleading.

There is a tendency to forget that it is not known world-wide that the establishment of the Geological Survey of Denmark and Greenland (GEUS) in 1995 resulted in the demise of DGU and GGU. We should communicate facts about DGU, GGU and GEUS accurately; yet misleading sentences in GEUS publications are unfortunately common. To the unsuspecting reader, the following statements misinform.

"Field work by the Geological Survey of Greenland (GGU, now part of GEUS)..... " is misleading. It *can imply* that GGU is still going strong as a unit within a new organisation called GEUS.

"Field work by the Geological Survey of Denmark (now GEUS) showed ....." is misleading. It *can imply* that DGU has been simply renamed GEUS.

It can help by using the word 'former' for the former Surveys DGU and GGU and the word amalgamated (= to mix, blend, coalesce, fuse). For example:

"Field work by the former Geological Survey of Greenland (GGU, amalgamated with its Danish counterpart in 1995 into the Geological Survey of Denmark and Greenland – GEUS) concentrated on ....."

"The former Geological Survey of Denmark (DGU, amalgamated with its Greenland counterpart in 1995 into the Geological Survey of Denmark and Greenland – GEUS) carried out ....."

Another common mistake is to use the name GEUS as a simple replacement of DGU or GGU. Like the opening sentence of this section, the following two examples must be avoided.

"Field work carried out by GEUS in 1992 showed ....." and "For decades GEUS has been engaged in ....."

Poorly formulated statements like the following must be avoided in any GEUS publication.

"GEUS has through the years produced and published maps of the Danish subsurface. Since 1990 the Survey has published ..... a total of 30 maps divided into 8 publicatons in GEUS' map series ..... (GEUS' map series 47, 48, 49 & 50)"

Not only does it badly misinform; it also introduces fictitious information about publications, viz. a non-existent map series and issue numbers.

It should also be remembered that Survey publications issued in 1996 were published by the Geological Survey of Denmark and Greenland (GEUS). Thus, while issues like DGU *Map Series* 53 and GGU *Thematic Map Series* 1996/1 are some of the final issues in the former series of DGU and GGU, they were *not published* by those surveys. A detail, one might say, but nevertheless, it is misleading for other than locals to say that DGU or GGU published in 1996 when the organisations did not exist.

Finally, it should be noted that the full name of the Survey should always be mentioned together with the first mention of GEUS in any scientific writing, including the Survey's own series.

Part 2. Publication system and manuscript flow

While the main principles of the publication system apply to all issues of the scientific series, some details of manuscript flow do not apply throughout: one exception is the yearly *Review of Greenland activities* for which special instructions, including deadlines for submission of manuscripts, are sent out each year.

Principles

The main elements of the GEUS publication system are shown in Figures 1 and 2, where three main stages in manuscript flow are outlined: pre-submission, editing and production. The publication system at GEUS is aimed at a manuscript flow from submission to printing in terms of months rather than years.

However, the success of such a timetable depends on the frame of mind and willingness of authors (and departments) to prepare manuscripts suitable for the scientific series and to ensure that GEUS style and standards are followed for typescripts and illustrations. Important from the onset is that authors should be aware of the differences in status and role between the scientific series and the report series, i.e. *Danmarks og Grønlands Geologiske Undersøgelse Rapport* (see Dawes & Glendal 1997).

Author and editor responsibilities

Stating one part of the equation (author responsibility) must be of course followed by the second (editor responsibility). Clearly, when authors prepare and submit manuscripts 'after the book', they are entitled to expect that the editing is likewise systematised and that manuscripts are effectively processed in a publication chain. Thus, three basic principles of the GEUS publication system are:

1. Manuscripts delivered for publication that do not follow GEUS standards will be returned to the author. This ensures that there will be no queue of poorly-prepared manuscripts taking up editor time and blocking for well-prepared manuscripts.

2. Manuscripts accepted as submitted are put in publication flow immediately; no manuscript should wait for in-house editorial action for any length of time at any stage of the publication flow.

3. Persons providing substantial (pre-submission) help to authors, i.e. English correction, rewriting, redesigning of illustrations, etc., and who also happen to be GEUS editors, do so under the relevant project of the author(s) and not under the auspices of the publications committee (publikationsudvalget). This help also includes 'in-house critical review' (see section below; Fig. 2). Note that projects budget for the reporting of results.

Editorial office (redaktionskontoret) and editorial secretary

The editorial office, staffed by the editorial secretary, plays a central role in the administration and production of the scientific series. The office registers manuscripts at submission and monitors all other stages in manuscript flow on a wall-board. The office makes sure that the delivered manuscripts are complete and in GEUS style; adjustments will be made by the office. The decision whether a manuscript has an acceptable technical standard is made by the office in consultation with editors.

The office can supply information on all aspects of manuscript processing, including the necessary forms for authors, editors and referees (see under 'Submission of manuscripts' and 'Referee assessment' below). The office is also responsible for compilation of the colophon page, compilation of any publication lists issued with a scientific volume, standard details of cover design, final technical editing, printing orders, contact to in-house and out-of-house production, ordering and distribution of proofs and handling of reprint requests in addition to the allocated free copies.

The editorial office checks the unbound copy after printing but before binding, and checks the finished product on arrival in the Survey before general release. The office distributes copies to authors, members of the publications committee, directors, referees and a few others.

In-house critical review (pre-submission)

Colleageal critical reading of manuscripts ought to be normal practise in any scientific institution. *Manuscripts by GEUS staff must be so reviewed prior to submission*. This assures a reliable standard, saves editorial resources and guards against misuse of external referees. Confirmation of this in-house critical review is part of the declaration signed by the head of department or project leader (Appendix 1).

All GEUS scientists must expect to provide critical reviews. Apart from pure scientific evaluation, some relevant points to be answered are given below. As a guide, the *Referee assessment* form, used for peer review, can also be consulted (see Appendix 4).

1. Is the subject material suitable for an international audience?
2. Does the complete manuscript have the necessary authoritative standard to be published in a GEUS scientific series? If not, has it a basis for becoming so?
3. Would some other form of publication be more suitable, e.g. the *Rapport* series?
4. Do all parts of the manuscript warrant formal publication? If not, could some data be released in the form of an appendix or in the *Rapport* series?
5. Are all relevant data included into the work? If not, why not?
6. Do the data presented warrant that other Survey personnel should have co-authorship?
7. Have the research results of others, including published sources, been adequately acknowledged?
8. Have any parts of the manuscript been published before?
9. Are there signs of unacceptable repetition?
10. Does the title of the work adequately describe its contents?

Language check

GEUS publications are not aimed at a perfect linguistic standard. However, many manuscripts so far submitted need attention (some considerable) to reach even an acceptable average standard. The writing of *any* Survey employee (including editors) can always be improved by colleageal help and manuscripts written by persons not proficient in English must be specifically read for language correction.

All language control takes place before submission (Fig. 2); manuscripts that are in substandard English will not be sent out to referees. Arranging for English correction is a departmental or project responsibility.

Submission of manuscripts

Address

Submission of all manuscripts is to the editorial office; manuscripts delivered to editors will be forwarded to the editorial office for registration. Material from external authors must be sent by post; material sent by fax or e-mail is not acceptable. The mailing address is: Editorial office, Danmarks og Grønlands Geologiske Undersøgelse, Thoravej 8, DK-2400 Copenhagen NV, Denmark.

Material

Three copies of the manuscript, each with complete sets of illustrations, must be submitted. Note that the figures and tables must not be integrated into the text (see p. 24). Illustrations should be reduced to required reproduction size, and for quality assessment, one of the sets must contain original photographic prints at the suggested reproduction size. Deliver all other illustrations as paper prints, i.e. do not supply colour transparencies or original artwork at this stage. All three sets of illustrations must be clearly marked with author names (see under 'Marking the material', p. 37). No diskettes are to be sent at this stage, unless specifically requested.

All the illustrative material, including copies of any photographic plates and maps, must be clean and legible, and suitable to be sent to external review *without modification or extra labelling*. All relevant details must be easily seen.

Manuscripts must be accompanied by two completed forms: *Declaration form* and *Authors' check list* (Fig. 2; Appendices 1, 2).

What constitutes a submitted manuscript?

A manuscript is accepted as submitted when the conditions stated above are met and the manuscript is in GEUS style; this includes bibliographic references. Manuscripts that do not

meet these requirements will be returned to the (first or corresponding) author with a copy of the *Declaration form* sent to its signatory (head of department or project leader; Fig. 2). The receipt of manuscripts by the editorial office will be acknowledged.

Chief editor and scientific editors

The chief editor and scientific editors are involved in editing part-time, combining the work with their research commitments. Therefore, while editors are always available with advice, the onus on preparing manuscripts in GEUS style rests with authors. Authors who have not followed in-house instructions should not expect editors to automatically help putting manuscripts into GEUS style.

The chief editor coordinates the editing of the three series, arranging the responsibility for a particular volume with a scientific editor. There may be more than one editor per volume. Work loads of editorial staff when a manuscript is submitted – as well as geological topic – will play a role in determining scientific editorship. Of paramount importance is that manuscripts are assessed immediately and are continually in publication flow.

Ad hoc editors

In addition to the permanent editors of the publications committee (two bulletin editors and two map series editors, see Dawes & Glendal 1997), ad hoc editors are appointed for specific volumes. *This work takes place in close co-operation with a permanent scientific editor who may act as joint editor.* This partnership is essential since an ad hoc editor is disqualified as regards peer review choice in cases where he or she has authorship interests (see below under 'Referee assessment' and Appendix 3).

It is vital that all ad hoc editors take the necessary time to acquaint themselves fully with GEUS standards. In short, ad hoc editing involves both scientific and technical editing, and *it is stressed that editing to international standards is a time-consuming affair.* This aspect should not be underestimated. Also, the job should not be mistaken with that of 'compiler' or 'organiser' of a report produced in limited numbers, i.e. a GEUS *Rapport*.

Referee assessment (peer review)

As well as review by the responsible scientific editor(s), manuscripts to the scientific series will undergo peer review by at least two independent referees appointed by the scientific editor(s). Both referees will normally be external to GEUS, and external to any projects being reported on. The choice of referees and all other decisions, for example whether more than two referees are to be involved, rest with a scientific editor. *A point which should be obvious is that no person can act as scientific editor and be responsible for the peer review of a paper to which he or she has authorship.* The standard *Referee assessment and check list* is shown in Appendix 4.

The author's aim must be that peer review will determine that the manuscript is scientifically and technically so well prepared and revised in-house that changes are minor and publication imminent. This scenario should not be just wishful thinking. However, often some sort of assessment involving the author(s) will be necessary (Fig. 2).

Revision and resubmission

All editor and referee comments must be taken into consideration when revising the manuscript. *One of the foremost duties of a scientific editor is to carefully assess the referees' reports, deliver the analysis to the author and ensure that assessment of all comments is made.* The action of the author to the comments must be clearly evident to the editor. To assist this, resubmitted manuscripts must be accompanied by a 'typed' statement (Authors' review declaration, see Fig. 2) outlining the author's attitude to the review and to the specific suggestions. It must be clear how these have been incorporated. Suggestions that have not been accepted, either wholly or in part, must be clearly specified.

An *Authors' check list* must be supplied with the revised manuscript. A revised manuscript that does not have this check list and the statement about action taken to referee and editor comments (Authors' review declaration), will not progress.

Diskettes at resubmission

The final text is set from authors' diskettes that must be delivered at resubmission. Many word-processing programmes can be handled, but Microsoft WORD is preferred (see also 'Preparation of diskettes', p. 42). All diskettes must be clearly marked with precise information as to their contents. Always keep the main text and illustrations on separate diskettes. Particular attention must be paid to diskettes containing illustrations, especially where only part of the illustrative material is in electronic form.

An accurate paper print-out must accompany each diskette submitted, together with the name and version of the computer programme. It cannot be stressed enough that precautions must be taken to ensure that all computer files submitted *correspond precisely* to the paper prints of text and illustrations.

It is the author's responsibility to ensure total correspondence between all types of material; delegation to a third party (draftsperson or secretary) does not remove this responsibility. There is a tendency that discrepancies of this nature are casually accepted as part and parcel of our electronic work style; at the time of writing, problems with out-of-date diskettes and illustrations are rife. This is a real time-waster and causes publication delay.

Cover illustration

At resubmission, the author should supply a photograph(s) or illustration for consideration as a cover design, with a full explanation of the subject. The chosen illustration should be

picturesque or eye-catching, or both. Illustrations can be graphic or photographic and of variable size, but must not exceed 171 mm in width, i.e. corresponding to printed page width.

Explanations must be intelligible without reference to the main text, although a page or figure reference to the main text is desirable. In general, the caption will be longer than a normal figure caption since the latter should not repeat information of the main text (see under 'Figure captions', p. 32 and 'Photograph credits', p. 33).

Back cover summary text

Scientific volumes will, from 1998 onwards, have a summary (appetiser) text on the back cover. Authors of single-article volumes and editors of multi-article volumes should supply this text written in a semi-popular style, i.e. with few specialist or technical terms. The text should be split into two or three short paragraphs and be no longer than 120 words. After an introductory paragraph, one paragraph should start with the words "This bulletin .....".

For examples, see the texts on *Geology of Denmark Survey Bulletin* 36 and *Geology of Greenland Survey Bulletin* 179.

Spine

For single-topic volumes a short version of the title of the volume should be supplied by the author (e.g. at resubmission) for use on the spine of the cover. This text must have no more than 70 characters inclusive of blank spaces.

Colophon page

A colophon page is standard in all GEUS scientific publications. It immediately follows the title page and is compiled by the editorial office. Authors need only supply keywords, explanation of the cover illustration and information about drawing and photographic work.

Proofs

Page proofs will be sent to the corresponding author. They should be returned to the editorial office within a week. *It cannot be stressed enough that authors must check proofs meticulously*, including the placing of figures and tables relative to text citation. Mistakes, both those that are routine and explainable, as well as the mysterious 'how is that possible' type, do occur in this electronic age. Electronic progammes are not infallible and keyboards can be activated inadvertently.

Check illustrations: colours and layers fall out, old layers (supposedly deleted) can still appear. The illustration file may have been opened for stylistic changes so the possibility of introducing errors is enormous.

Normally, the second proof will not be sent to authors but if done, renewed detail control of the paper is requested. New mistakes may have been introduced, and colour can disappear on printing: recently, coastlines of several maps disappeared in third proof!

Seeing your text in page proof may stimulate a wish to change statements and restyle passages. Such polishing should have been done previously. Alterations requested to the text and illustrations in proof will be at the discretion of the editorial staff.

Reprints

The general rule for single-article volumes is: 1 or 2 authors, 50 free copies; 3 or more authors, 75 free copies.

Any reprints required by authors in excess of the available free copies must be ordered from the editorial office following acceptance of the paper or at resubmission. Prices of extra reprints are available from the editorial office. Reprints cannot be ordered after the blueprints have been returned to the printer.

Extra reprints for departments must be ordered (either direct or via authors) at the same time as extra reprints for authors, together with a clear statement of where *both* the reprints *and* the bill for them are to be sent. It is the responsibility of the authors to make sure that their departmental requests are submitted to the editorial office.

Reprints are supplied without covers. Where covers are required a file on a diskette with the text and any logo or illustration must be supplied. Covers are charged for at cost.

Note that reprints are not normally made of articles in multi-article volumes like *Review of Greenland activities*; authors are supplied with several copies of the whole work.

All reprints are sent to the corresponding author for internal allocation unless any other arrangement is made.

Format, lay-out, print-run

For these topics and other information about the scientific series, see Dawes & Glendal (1997).

Part 3. Preparation of the manuscript

Authors should consult back-numbers of the relevant series to check on make-up of the publication, style and format as well as details like the style of the abstract page and the positioning and style of authors' addresses. For bibliographic style consult *Geology of Denmark Survey Bulletin* 36 and *Geology of Greenland Survey Bulletin* 179 and following issues. Note that the compilation of the colophon page is the responsibility of the editorial office, not the author (see pp. 18, 22).

Note. Authors should not try to imitate the typography of the series, *and do not integrate illustrations into the text.* For titles, authors and headings, fully capitalised (upper-case letters) words should not be used; the requirement is simply that the different heading grades are clearly distinguishable. Typography will be chosen by the editors.

Author's typescript

Typescript composition will vary slightly depending on whether the paper is a single-work volume (i.e. most Survey Bulletins and all *Map Series*) or part of a multi-article volume. The most complete typescript is composed of the following sequentially arranged items, all starting on a new page unless otherwise stated. For most papers the first seven items apply but in some multi-article volumes (short papers), like *Review of Greenland activities*, there are no abstracts, keywords or contents lists to individual papers. In such volumes, any abstract or preface/foreword, and the table of contents are compiled by the editors.

1. Title page, with keywords at the bottom of the page.
2. Table of contents.
3. Abstract.
4. Author's address (at the end of abstract)*.
5. Main text, including acknowledgements.
6. Reference list.
7. Figure captions†.
8. Explanations to plates, appendices, maps, fold-outs and enclosures†.

* In volumes like the annual *Review of Greenland activities*, where the articles are not abstracted, addresses come after the reference list as an endnote.
† Explanations to tables, viz. headings and footnotes, are integral parts of the tabular format and therefore not delivered separately like captions to figures, plates, maps, etc. (see under 'Tables', p. 38).

General format

The typescript should be on international A4 size, standard-weight paper, and be one-sided, single column, 1.5 or double spaced with all-round generous margins (at least 2.5 cm), and flush left, not justified right. *Do not use extra manual character spaces,* i.e. don't

use two spaces after a full stop at the end of a sentence. Use tabular indentation for start of a paragraph, except after a heading. Avoid all hyphenation; put the whole word on the next line. Pages must be numbered consecutively at the top right, and the pagination should include the references, figure captions and any explanation of appendices and maps. Tables and illustrations should not be in the text file (see under 'Diskettes at resubmission', p. 21 and 'Preparation of diskettes', p. 42).

Choose an easy-to-read standard type face which has a clear distinction between hyphen (bindestreg), en-rule dash (kort tankestreg) and minus sign, and between 1 (figure), l (letter) and I (see under 'Symbols and letters', p. 56). Do not use automated features such as bullet numbering; the desk-top publishing programme cannot handle them.

Do not use a desk-top publishing programme to key in or lay-out the text, e.g. Page Maker, Ventura, Quark Xpress. Any characters that the word-processing programme (or printer) cannot handle must be clearly marked by hand in the margin of all paper copies submitted.

Note on capitalisation

Manuscripts prepared in GEUS style *do not use fully capitalised words* (upper-case letters) except in cases of direct quotation and for acronyms and other abbreviations, e.g. USA, NASA, GEUS. Single capital letters are used in a variety of situations: first word of a sentence, heading or solitary phrase; first word after a colon where the phrase is a question; proper nouns and formal names, e.g. Lellinge Greensand, Department of Earth Sciences, Operation Grant Land (see also under 'Structural geology', p. 49).

1. Title page

The title page should contain three items: title, author name(s) and keywords at the bottom of the page. Note, no full stops. Don't clutter the page with series name, addresses, or messages to editors, etc.

Title

A manuscript starts with the title in *lower-case letters* except for any proper nouns and the initial letter. The title should be concise and informative; regional geology descriptions should always indicate adequate geographical location. Browse your title and remove superfluous words. *Avoid cluttering titles with geographical coordinates*, and remember that Survey project names usually have no interest to the international reader.

Author name(s)

Names of author(s) must be given in lower-case letters with initial capitals. At least one first name should normally be given for each author, together with any initials for other names. An important bibliographic point is that authors should always publish with the same form of

name; make sure that second and third initials, once used, are included. Don't use nicknames in formal publication.

Keywords

These should cover the main geoscientific topics of the paper, as well as geography and location. Single words and short phrases (maximum three words) are permitted; the maximum number of items is fifteen. Each item is separated by a comma. For guidelines, authors should consult a thesaurus of scientific terms, e.g. Goodman (1997).

2. Table of contents

The contents page (seldom more than one printed page) lists, with page identification, the principal sections of the paper, including the material following the main text and references, viz. plates, appendices and fold-outs, and loose maps (in pocket). *Authors should make sure that the wording (and spelling) used in the contents coincide precisely with the wording of section headings of the text.*

The number of headings printed in the table of contents in the final paper will normally be restricted to three or four orders. Only in some systematic works, e.g. comprehensive lithostratigraphic accounts, will five or six units of hierarchy be allowed, at the editor's discretion.

However, authors must always submit a complete table of contents for their paper including all non-repetitive headings used. Not only is it a good exercise in structuring a text, but it can be very helpful information for critical reviewers and editors.

3. Abstract

The abstract is a summary of the factual contents of the work. It should highlight new findings and conclusions. In many cases, the abstract is the only part of the work that is fully read; thus from this point of view it is the most important part of the paper and should be intelligible in itself without reference to the paper (or other papers) *and should be split into logical paragraphs*. As the abstract is always given with the title, it should not repeat this. New terminology or formalised nomenclature should be mentioned; in systematics (e.g. palaeontology, mineralogy, etc.) new names should be given in the abstract.

The abstract is often the final item to be written. Therefore, in the pressure to meet deadlines, it can fall into the category of rushed writing (see pp. 11–12). Resist this. *Make sure that the abstract receives the same colleageal scrutiny and reworking as the main text.*

An abstract should not exceed one printed page; exceptions will be considered. In short papers in multi-article volumes, the abstract should ideally not exceed 200 words; in single-work volumes (most bulletins), the maximum number of words that can be accommodated

on one page is about 460. Abstracts are in the language of the text: English; in some cases other languages may be warranted, viz. Danish, Greenlandic, Faeroese or German.

4. Authors' addresses

All authors must be furnished with an address, with any affiliation as part of it. If an e-mail address is available, please supply with the full post address. If an author has recently moved, then a second address can also be given. Author address and affiliation can change during the processing of manuscripts; *authors must keep the editorial office informed of such changes.*

Consult back-numbers for positioning and style of addresses. Note that in multi-author papers, where there is a need to distinguish between different addresses or affiliations, authors' initials are inserted before the address.

5. Main text, including acknowledgements

Section make-up

Apart from very short, 'page-filler' articles where there may be no sections, the main text should always contain an introduction and some sort of final remarks, e.g. discussion and conclusions. The paper should pass logically from the general (introduction) through the specific (data and results) back to the general (conclusions). The structure of the specific part into sections and subsections is extremely important and care should be taken to present descriptions, data and intepretation in orderly sequence.

Except for the above sections, only one other section is normally compulsory in the scientific series: a section on economic geology in the *Geology of Denmark and Greenland Map Series* (see under 'The scientific series', p. 14).

Headings and paragraphs

Choice of headings should help the reader through the subject matter so that the various topics can be easily relocated. Section subdivision should be logical: for example within a section entitled 'Previous work', a subsection called 'Present study' is misplaced. After completing a paper and compilation of a table of contents, take time to reassess the headings to see if they depict adequately the section contents and represent the most practical subdivisions of the text.

In single-work volumes the first paragraph will start on a new page and there should be the heading 'Introduction'. However, in short articles, the introductory paragraph of the main text is on the same page as the title (and, if present, the abstract) and should not be headed 'Introduction'.

The first line after a heading is not indented; all other paragraphs have the first line indented with a tabulator. Headings should not be numbered or followed by a full stop (period).

Grades

Two or three grades of heading are usually sufficient in short articles; more heading levels may be necessary in single-work volumes. It is essential that each grade has a distinctive style (size, boldface, italics) or placing (central or flush left); it is not necessary to copy the typography of the series. Always use lower-case letters; use only an initial capital after a full stop and in proper names (see 'Note on capitalisation', p. 25).

Introduction

There is no set way of writing an introduction, but it is important to note that its role should not be confused with that of an abstract. It should contain information about the nature and scope of the study, reference to any problem to be addressed and, if relevant, the connection to the relevant Survey project during which the work was carried out. Depending on the type of paper (whether short article or monograph), other introductory subjects such as details of the study area (location, name, limits, size, etc.), physiography, previous work, field work, etc. can either be included in one introductory section as subsections or given section status.

Reference to figures, tables, plates, appendices, maps

In textual references, distinction is made between items from own text and items from elsewhere: see Sønderholm *et al.* (1998) for all types of bibliographic citation.

Internal references

Textual references to figures are abbreviated, e.g. (Fig. 1) or (Figs 1, 22, 34) while 'Table', 'Plate', 'Appendix' and 'Map' are always written in full, e.g. (Table 2) or (Plates 1, 3, 5). Note the space before the first numeral. At the beginning of a sentence 'Figure' should be written in full, e.g. "Figure 4 shows that ....." or "Figures 4 and 6 show that ....". Do not use an ampersand (&) to replace 'and' in connection with text references or within a sentence (see 'Use of the ampersand', p. 57).

Where there are three or more consecutive numbers involved, use an en-dash (kort tankestreg) to join these, e.g. (Figs 4, 5, 12–14, 22–28), or (Appendices 1, 2, 4–6). The use of this punctuation is explained in the section 'Use of hyphen, en-rule dash and slash', p. 51.

In referring to composite figures use the following forms: (Fig. 2a, c, e) and (Fig. 2a–c). Note, no space between numeral and letters. Use a semi-colon to separate items within parentheses, e.g. (Fig. 5; sample locations Fig. 8). In citations involving more than one il-

lustration type adhere to the sequence: figure–table–plate–appendix–map, e.g. (Fig. 3; Plates 4–6; Map 2).

External references
Citations of illustrations from other articles are distinguished by the use of a lower-case letter, e.g. (Christensen & Simonsen 1995, fig. 5), "as shown in figure 5 of Petersen (1995)….." or, if combined (Fig. 5; Ottersen 1982, fig. 5).

Order of citation
Figures and tables are each cited in the text in numerical sequence and normally they will be positioned as close to the initial citation as possible. Reference to illustrations should be so designed that they are placed in that section of the text to which they are most relevant. *However, early (premature) reference to a relevant illustration is recommended as a help to the reader.* Such references are in the form (see Fig. 35) rather than just (Fig. 35).

Page references

For cross-referencing to pages within a paper, the following forms are used: "As shown on p. 42 ....." , "As shown on pp. 42–43....." and "as shown previously (see pp. 42, 44)". Note use of an en-dash between consecutive page numbers (see under 'En-rule dash', p. 52).

Quotations

Textual quotations from another work should be given in double quotation marks, " ….." or, if accentuation is needed, put in italics (without quotation marks; see 'Quotation marks', p. 52). Precise referencing of a quotation inclusive of page number is obligatory; if the passage runs over two pages, say so, e.g. (Hansen *et al.* 1994, pp. 25–26). If the citation comes from a figure caption or from a table, appendix, etc. give this information as well as any page number, e.g. (Jensen 1993, table 2, p. 16) or (Johansson 1954, map in pocket). See Sønderholm *et al.* (1998) for full information on reference citations.

Where the author adds his own interjections in a quotation, the words concerned must be enclosed in square brackets, [……]. Quotations must retain the spelling and punctuation of the original work. Do not modify, even apparent misspellings. To indicate the omission of any parts of a quotation, however small, use six stops.

Note that citation of titles of scientific works placed in the reference list are strict quotations (see under point 3 on p. 31), yet given without quotation marks. The same rule applies as to text quotation: do not abbreviate, transpose or modify apparent misspellings or inaccuracies (see Weidick 1967, p. 32).

Single quotation marks ('.....') can be used to highlight other words and phrases.

Lists

These are of two types.

1. Phrases and short sentences with number placed in parentheses in running text. For example see (1) and (2) under 'Footnotes' below.

2. More than one sentence or longer sentences (i.e. sentences consisting of several lines) are regarded as paragraphs. These are given a number followed by a full stop and flushed with the left margin (as here). The second and following lines are indented and a blank line is inserted between the individual items. There should also be extra space before and after the list, and it should be quite clear whether the following text heralds a new paragraph (see examples on pp. 17 and 43, and in *Geology of Denmark Survey Bulletin* 36, pp. 72–74).

In some cases, for effect, phrases and short sentences may be listed as type 2. There is then no blank line between the individual items; see examples on pp. 11 and 18.

Equations and formulas

All mathematical and chemical expressions must be centered in the text, sequentially numbered with numbers in parentheses flush with the right margin. A series of equations should be double spaced. There must be extra line space before and after the equation.

$$\underset{\text{(pyrite)}}{3FeS_2} + \underset{\text{(gas)}}{2O_2} = \underset{\text{(magnetite)}}{Fe_3O_4} + \underset{\text{(gas)}}{3S_2} \qquad (1)$$

$$2Ca^{+2} + Fe^{+3} + 2Al^{+3} + 3SiO_{2aq} + 7H_2O = Ca_2FeAl_2Si_3O_{12}(OH) + 13H^{+} \qquad (2)$$

Footnotes

In general, *text footnotes* will not be accepted; often such information can be incorporated into the text. Acceptable footnotes are of two types: (1) as addresses, either on the abstract page or on the last page (endnote) in volumes like *Review of Greenland activities*, and (2) in tables. Some plates and appendices may also have footnotes.

Acknowledgements

Most scientific publications today are the result of teamwork of one sort or another: scientific, technical, administrative, clerical and editorial. Only persons who have made a substantial contribution or have helped outside their line of duty are put in the acknowledgements; thus routine clerical and technical work is not included. General recognition for drawing and photographic work appears on the colophon page. For Survey authors, emphasis should be on acknowledging external help, particularly those who have improved the scientific substance and supported it financially. The latter acknowledgement is obliga-

tory. Check carefully the name of the funding body, e.g. the difference between the Danish Natural Science Research Council and the Danish National Research Foundation.

Information about the source of analyses is important, but the name of the laboratory or analyst must be placed in the text and tables (see Table 1), *not in the acknowledgements*. Only in cases where an analyst has specifically aided the interpretation of the results, and thereby added to the quality of the study, is inclusion in the acknowledgements valid.

Titles (e.g. Professor, Dr., State geologist) and degree status (e.g. Ph.D., M.Sc., cand. scient.) are to be avoided. Likewise, laudations of praise for help and unfailing support through many years or to family for understanding and forgiveness, will be removed by the editors.

6. Reference list

The reference list contains the sources of information quoted in the paper; it should not be mistaken for a bibliography. It is headed by the word 'References'.

Full information on the Survey reference style is given in *A standard bibliographic style for GEUS' publications: a guide for authors and editors* (Sønderholm *et al.* 1998). The elements making up a reference are given below but for the order of references in the list, and for examples of *all* DGU, GGU and GEUS publication types, refer to the report.

A reference in GEUS style comprises *several* of the following *sequentially arranged* elements.

1. Name of author(s), editor(s), compiler(s) or the like. (When more than ten use *et al.*, see Holland *et al.* (1978) on page 32.)
2. Year of publication.
3. Title of work. (Do not abbreviate or change possible misspellings.)
4. Name of author(s), editor(s) or compiler(s) of book, collection or special volume. (When more than three use *et al.*, see Grunsky *et al.* (1992) on page 32.)
5. Title of book, collection or special volume.
6. Edition. (Only if 2nd or later edition.)
7. Name of journal or serial publication. (In full, with original wording and punctuation.)
8. Conference name or venue information.
9. Volume identification, numerals and letters. (In **boldface**.)
10. Page numbers.
11. Figures, tables, plates, appendices, maps. (Only given in some cases, e.g. where these form a separate volume and in map publications when more than one map.)
12. Name and location of publisher or issuer. (Variable order to indicate published or unpublished.)
13. Supplementary information in parentheses. (For example, language, dual publication outlets, electronic forms, depository and identification information.)

The order of these elements is strictly adhered to in all references. Thus, page numbers only conclude a reference when elements 11, 12 and 13 are missing, i.e. in most journals

or serial publications but *never* in books, theses or unpublished material which always must be furnished with the name and location of the publisher or issuer.

The references below cover all 13 elements in the above list, so numbered for illustration.

Article in journal

1 2 3 7 9 10
Weidick, A. 1967: About the use of the expression "inland ice". Journal of Glaciology **6**(47), 763 only
13
(letter to the editor). [Note retainment of inaccurate spelling of Inland Ice.]

Book

1 2 3 6 10 12
Pettijohn, F.J., Potter, P.E. & Siever, R. 1987: Sand and sandstones, 2nd edition, 533 pp. New York:
12
Springer-Verlag.

Authored serial volume

1 2 3 7
Holland, C.H. *et al.* 1978: A guide to stratigraphical procedure. Geological Society Special Report (London)
9 10
11, 18 pp. [More than ten names in element 1, therefore *et al.* form is used.]

Article in edited serial volume

1 2 3
Grunsky, E.C., Easton, R.M., Thurston, P.C. & Jensen, L.S. 1992: Characterization and statistical classifi-
3 4
cation of Archean volcanic rocks of the Superior Province using major element geochemistry. In: Thur-
4 5 7 9 10
ston, P.C. *et al.* (eds): Geology of Ontario. Ontario Geological Survey Special Volume **4**(2), 1397–1438.

[More than three names in element 4, therefore *et al.* form is used.]

Unpublished report

1 2 3
Thomassen, B. & Schönwandt, H.K. 1981: Prospecting for Cu-Pb-Zn-Ag-Au in the Upper Permian
10 11
sediments and Devonian volcanics of East Greenland, 100 pp. + map vol. Unpublished report,
12 13
Nordisk Mineselskab A/S, Copenhagen, Denmark (in archives of the Geological Survey of
13
Denmark and Greenland, GEUS Report File 20702).

Article in conference, symposium, congress proceedings, etc.

1 2 3 8
Kujansuu, R. 1969: On the landslides in Finnish Lapland. IX Nordiske geologiske vintermøde Lyngby,
8 10
Copenhagen, Denmark, 5–7 januar, 1970. Program og resumeer af foredrag, 51 only.

7. Figure captions

The figure captions must start on a separate page and be numbered following the 'References'. Each caption must be intelligible without reference to the text and should not duplicate any text. Sometimes the phrase 'see text, p. xx' is appropriate to avoid repetition. Each caption begins with 'Fig. xx.', etc. The explanatory part of the caption is followed by any information about location, scale, source, photographer and, if relevant, copyright (see p. 35).

Composite figures

When a figure contains several parts they should be labelled **a**, **b**, **c** or **A**, **B**, **C**, etc. Choose either lower- or upper-case letters for all figures; *mixing of type is not allowed.* In the figure captions the letters are in boldface and followed by a comma in cases where the parts are separated by a semi-colon, e.g. **a**, cross-bedded sandstone .....; **b**, general view ..... and by a colon where the parts are separated by a full stop, e.g. **A**: Mudstone interbedded ..... . **B**: Massive to semi-massive ..... . **Above**, **below**, **left** and **right** (in boldface) can also be used in the caption where there are unlabelled frames.

Use of boldface

Wherever parts of composite figures are described in the caption either by identification letters **a** or **A** (see above) or by words – **above**, **below**, **left** and **right** – boldface must be used to help the reader to find the relevant explanation.

Location

In illustrations of field geology, the location of the outcrop or scene is *vital* information. The wording of your caption must be sufficient to give the reader a reasonable chance of finding the locality. In addition, geographical coordinates (lat. and long.) or UTM coordinates (including zone) can be given.

Scale

Most illustrations need a scale. You are clear about the scale, the reader may not be; *never leave the reader guessing.* Photographs of field geology must always be scaled; if there is no artifact scale, introduce a scale bar or give a dimension in the caption that refers to a shown feature.

Remember that fjord walls or mountains 200 m, 500 m, 1 km or 2 km high can look much the same to an uninformed reader. Noting that mountain summits are 2000 m a.s.l. when sea-level is not shown, *tells the reader nothing about the relief of the features shown.* It is interesting information, but is not sufficient as scale, i.e. relief.

Photograph credits

With the exception of the cover illustration and any frontispiece, there are no photograph credits for authors as photographers. In all other cases credit should be given; this is particularly relevant if the photograph is other than Survey property. If the photographer is unknown the source of the material must be given.

Credit should be given in the form 'Photo: P.R. Berthelsen'. If a date of the scene could be of scientific relevance – as for example in glaciology – use the form 'Photo: W.C. Benzton,

24 December, 1974'. For illustrations that are part of a numbered series, e.g. aerial photographs or satellite images, frame identification must be stated. For example, 'Aerial photograph, 543E-V 5729, Kort- og Matrikelstyrelsen, Copenhagen, Denmark'.

Repository and sample numbers

All illustration of geological samples and specimens *must be furnished with* a number and, if not applicable to GEUS archives, repository details. Special rules apply to palaeontological material, see below.

Note that GEUS expeditions to Greenland still use GGU sample numbers; the letters GGU must accompany such numbers. As explanation, the following phrase can be used: "The six digit GGU numbers refer to material from Greenland in the files of the Geological Survey of Denmark and Greenland".

Palaeontological illustrations

In palaeontological illustrations, all figured specimens must contain number(s) and repository. Those collected under the auspices of DGU, GGU or GEUS should retain their respective numbers, as well as a Geological Museum catalogue number, which represents the final repository, written in the form 'MGUH 21.283 from GGU 313115' (see 'Systematic palaeontology, p. 48). The host stratum and locality should be given in the caption.

Acknowledgement of source

The same etiquette of source citation applies to text and illustrative material. Thus illustrations compiled from the work of others must be acknowledged. However, it is difficult to define the limits where source citation is superfluous, e.g. coastlines and topographical features taken from standard maps, but if in doubt, the general rule is: give a source. Failure to acknowledge can amount to plagiarism.

The choice is restricted to one of the four categories below. Such source citation is an important part of the caption information and is *not placed in parentheses*.

1. 'From Simonsen (1956)'. This means what it says, i.e. it is a direct reproduction (*facsimile*) of Simonsen's illustration. Any change of shading, text and colour, however minor, *excludes* inclusion in this category. Permission is usually needed when the original source is not Survey (DGU, GGU and GEUS).

2. 'Slightly modified from Simonsen (1956)'. There have been made minor changes to the original illustration, e.g. more localities, annotations, more points in a plot, text or ornament changes, etc.

3. 'Modified from Simonsen (1956)'. This means that significant changes to the information as portrayed by Simonsen have been made, e.g. boundaries moved, new divisions introduced, legend revised, etc., but Simonsen's basic information is preserved. This can involve partial or total redrawing.

4. 'Based on Simonsen (1956)'. The illustration has been totally redesigned with loss of original information, but elements or ideas from Simonsen are still present.

Copyright

The responsibility of obtaining permission to use other material than that copyrighted by GEUS lies with the author(s) and must be obtained from the copyright holder. An acknowledgement must be built into the relevant captions or collected in the 'Acknowledgements' at the end of the main text.

A statement about clearing of copyright is included in the *Declaration form* (see Appendix 1). Information on permission to publish an illustration should be the final part of the figure caption (see under 'Figure captions', pp. 32–33).

Maps and reconstructions

A map should be treated as showing present-day geography unless otherwise stated. Reconstructions of landmasses without a qualified caption represent blatant misinformation.

Captions to maps that display land in any position other than present-day geography must clearly state this; for example "A reconstruction of the North Atlantic in .....". The nature and source of the reconstruction should also be given. See also under 'Reuse of illustrations: a warning', p. 42.

8. Explanations to plates, appendices, maps, fold-outs and enclosures

Explanation of tables, i.e. headings and any footnotes, are integral parts of the tabular format and are therefore presented with the tables (see under 'Tables', p. 38). Explanations to plates, appendices and any maps or enclosures are presented on separate sheet(s) of paper with page numbering following the figure captions.

All material must be clearly marked with item number and author name(s) (see under 'Marking the material', p. 37).

Part 4. Preparation of illustrations and tables

Principles

How many illustrations?

The answer to this question is not straightforward. In short, there should be adequate illustrations to support or confirm your arguments and to give the reader a feeling for the topic or region discussed. Illustrations must be referred to in the text but should not duplicate it. If an illustration does not have a specific purpose it should be omitted.

Illustrations and their captions are those items, along with the abstract, that are most studied. Their importance cannot be overstated. However, standard scientific articles are not 'picture books'. Too many illustrations not only clutter the text and take up space (also expensive), but when in excess they can take the emphasis away from important arguments in the text. Some volumes like *Review of Greenland activities* are exceptions where spectacular colour photographs can be added for effect.

Some musts

Location maps are vital in scientific writing. All papers in the scientific series must contain one or more illustrations (aim at composite figures) that localise the study area(s). All relevant place-names from the text should be shown, see examples under 'The central theme: help the reader', p. 10. Samples should, wherever possible, be localised on a map.

Many disciplines of geology have obligatory illustrations determined by international codes, e.g. holotypes, type localities, etc. An example of an illustration type that is essential for the reader – but the importance can be 'forgotten' by the author because of long-standing familarity – is in formal lithostratigraphy, where a diagrammatic scheme is the optimal way of summarising and understanding stratigraphic revision (see under 'Lithostratigraphic schemes', p. 47).

Design after format

The page format of the series (see below) should be considered in designing all illustrations, both those to be integrated in the text and any folded enclosures. Figures and tables are inserted in the text; plates and appendices appear at the rear. In some cases, extensive tabular forms, although containing comparable data to those in tables in the text will be treated as appendices and placed at the rear. For sequential order of illustrations in the text, see under 'Order of citation', p. 29.

Labelling of composite illustrations should be by upper- or lower-case letters: a, b, c or A, B, C, etc. (see under 'Composite figures', p. 33).

Marking the material

At submission, all illustrations must be clearly labelled with the author's name (use the *et al.* form if more than two authors) and the item number; remember to mark the way up where there is ambiguity. The suggested reproduction size should be stated (see 'Format' below). For computer drawings, reproduction-quality hard copies at the intended size must be provided (see under 'Submission of manuscripts', p. 19, for material to be submitted).

Format

The page size of the two Bulletin series is 210 × 280 mm; that of the Map Series is A4 or 210 × 296 mm. All illustrations should be designed to fit one of three widths: 1 (82 mm), 1½ (112 mm) or 2 (171 mm) columns. Maximum heights are 232 mm (Bulletins) and 235 mm (Map Series) but remember to leave space for the caption in full-page illustrations.

Design in 'portrait-style'; sideways arrangement on the page, i.e. 'landscape-style', will only be accepted as a last resort.

Two-page spreads

Exceptionally, illustrations and tables can span over two pages (four columns). This is better than to have to turn the page. Three-column spreads are also possible. All illustrations over more than two columns must be designed with care, and it is advisable to consult editorial staff before planning. Break the illustration in a place with least disturbance, i.e. avoid a critical part of the illustration, and position the text so as to avoid being cut in two. For larger illustrations, see below under 'Maps and fold outs'.

Figures versus tables and plates

There is a transition between figures and tables as regards content but for the most part they are clearly distinguishable. In general, tables are ideal for displaying statistical data that can be arranged in closely spaced columns without vertical lines, e.g. chemical analyses. Figures that have a tabular form generally contain less information, they have other lines than the horizontal ones of tables and they can include graphic representation, e.g. shading of areas. If in doubt, consult an editor before definition as one or the other.

High quality photographs in earlier publications were frequently printed on different paper and bound at the end of the text. This distinction is no longer required as everything is printed on the same paper. Therefore grouping of photographs at the rear is discouraged; disperse at the appropriate places in the text and refer to as figures. These comments do not apply to material treated as appendices or folded material, designated 'plates'.

Plates are full-page with page number, or folded sheets. They are best suited to monographs. Larger plates will appear at the rear: as enclosures in a pocket or as fold-outs (see below).

Maps and fold-outs

Illustrations or tables larger than will spread over two pages are treated as loose fold-outs placed in a pocket attached to the inside of the rear cover. They are accepted, but only after consultation with an editor. Since they are loose they must have publication identification number at the top left and plate or map number placed at the top right. The editor determines the font and size for this identification text.

Fold-outs are often printed on a different quality of paper that will stand frequent folding. *Consult editorial staff before planning maps or fold-outs for the scientific series.*

Tables

Tables are to be typed on separate sheets and submitted as separate file(s). They should be complete with all explanations; a heading is obligatory, footnotes provide explanatory information (see below). Make sure that spaces between columns are made using the tab key and not the space bar. Design tables to fill a column or page, and as far as possible in 'portrait style'. 'Landscape-style' tables (sideways arrangement on the page) will only be considered when there are a large number of columns. Vertical lines should not be necessary and normally only three horizontal lines are present, those defining the top and bottom of the table and column headings (see Table 1, p. 39 and Table 2, p. 44). In rare cases for clarity, vertical lines are included, see *Geology of Denmark Survey Bulletin* 36, table 3.

The standard style is shown on the next page designed to bulletin column width of 8.2 cm. Headings should be short but informative; simply 'Table 1' is insufficient. The heading is centrally placed with no full stop after it.

All explanations are given in footnote form *with each item placed on a separate line*. The following symbols, used in the order given, are recommended: * † ‡ § ¶. For more than five footnotes, superscript numbers or lower-case letters can be used, but care must be exercised that such numbering cannot be misunderstood as exponents.

The use of isolated hyphens in listings must also be explained; a hyphen can mean one of several things, viz. 'not present', 'not detected', 'not analysed for', 'data not available', etc. Don't assume that the reader knows your intent; explain. Use 'n.d.' to indicate that a component is not detected and 'n.a.' for one not analysed (see Table 1). These should *always* be explained in the footnote; n.d. could be taken as 'not determined'.

In major element chemical analyses, oxides must be given in standard order, viz. SiO_2, TiO_2, Al_2O_3, Fe_2O_3, FeO, MnO, MgO, CaO, Na_2O, K_2O, P_2O_5, CO_2, H_2O^+, H_2O^-, volat. (l.o.i.). Recalculation to 100% is not recommended; only the original values should be given. Any averages given should carry standard deviation.

Table 1. Analyses of selected elements of ten mineralised samples from site Fictitious

Sample no.	Ag* ppm	Au† ppb	Cu‡ ppm	Zn§ %	Pb§ %	Fe¶ %
522[a]	1.5	272	943	n.a.	n.a.	n.a.
2461[b]	34	15	10	2.75	3.10	2.72
2462	2.5	7	n.a.	0.72	7.52	9.80
2463	n.d.	25	n.a.	15.20	0.40	7.25
98602[c]	22.4	47	5.5	8.31	0.01	24.74
98615	1.5	52	n.a.	3.22	0.15	18.20
98722	n.a.	n.d.	1820	n.a.	n.a.	n.a.
98894	n.d.	2	5	0.02	0.001	2.08
98942	150	74	15	25.5	9.9	5.06
98943	4.2	n.d.	n.a.	0.52	0.06	6.55

* total digestion: inductively coupled plasma emission (ICP).
† fire assay/ICP.
‡ atomic absorption spectrometry (AAS).
§ instrumental neutron activation (INA).
¶ Fe is total iron determined by INA.
n.a. not analysed for.
n.d. not detected; below limits of 0.4 ppm (Ag) and 1 ppb (Au).
[a] sample from Kryolitselskabet Øresund A/S deposited at the Geological Survey of Denmark and Greenland (GEUS).
[b] samples 246 etc. are from collections stored at the Geological Museum, Copenhagen.
[c] sample 98 etc. are GGU numbers in archives at GEUS.
All analyses by Mineral Exploration Labs, Ontario, Canada, except AAS (Cu) from GEUS laboratory.

NB The contents of this table are fictitious.

Photographs

The scientific series are based on black and white photographs. However, colour photographs are considered when appropriate, but must be accompanied by an argument for each photograph why it must be in colour (see under 'Colour diagrams and photographs', p. 42).

Photographs must be clear and sharply contrasted, but without pronounced light areas and heavy shadows. They should be glossy prints. When incident light is used for illumination, for example of fossils, the light should fall consistently from the upper left.

Photographs should be unmounted unless the illustration comprises several photographs to be reduced to the same scale. If composite, all items should be of similar tone and contrast; they can be mounted on white board and should be labelled a, b, c, etc. in the bottom left or top left corner. Do not annotate directly on the print and do not mount photographs on black paper or board.

It is essential that the author assesses each photograph for relevance of detail. Don't just submit standard photographs showing 100% negative/diapositive frame. Always crop to focus on the required motif; all unnecessary background fringe detail (including large expanses of sky and deep shadows) should be removed.

Remember to include in the caption such information as scale, location, sample number, repository, etc. (see under 'Figure captions', p. 32), and also to mark photographs on the back (see under 'Marking the material', p. 37).

Annotation of photographs

Annotation must be made on an overlay not on the photograph itself. The overlay need not be transparent, but it is practical if it is. The overlay is treated as artwork. It may be reproduced in positive (black) or negative (white) form on the final print. Always make the artwork in black indicating whether it is to be positive or negative; if simple both positive and negative can be given on the same overlay. Attach the overlay along one side of the original photographic print so that it will hinge, and always make sure that corners are clearly marked.

If a diapositive (colour slide) is involved, use a paper copy of the photograph to prepare the 'manuscript'. *Mark clearly* where the dias is to be trimmed, and make the overlay with the annotation artwork fit this paper copy. The paper copy is *only* a guide to the draftsperson; it is not used to make the final product.

Line drawings

All standard-size line drawings should be prepared by computer and be available on file(s). Hand-drawn diagrams, viz. black ink and 'Letraset', will be accepted in some cases.

Drawing staff at GEUS have detailed guidelines on how to produce illustrations for publication in the scientific series. It is important from the onset to plan the proper use of such things as upper- and lower-case letters, en-rule dashes (Danish: kort tankestreg), etc. For use of the latter, see 'Use of hyphen, en-rule dash and slash', p. 51.

It is vital that figures are designed to be reduced to known format (see 'Format', p. 37). Where figures are designed for full page, space should be left for the caption. Where there is no place, the caption will be placed at the bottom of the nearest column on the facing page. Obviously a series of full-page figures with no place for captions will create problems. Only exceptionally will a figure be allowed to occupy the space of the page number.

At submission (see p. 19) all figures should be supplied as paper copies, normally not larger than A3. Photographic reductions are necessary where the original is of very large dimensions, but the original material must always be available to the editor if requested. Diskettes with all computer-drawn diagrams must be available at resubmission (see under 'Diskettes at resubmission', p. 21).

Care must be taken to ensure clarity of text and ornamentation after reproduction. For guidance, line thickness should not be less than 0.2 mm after reduction and the smallest upper-case letter should never be less than 1.5 mm in height. Use a *sans serif* typeface (i.e. without feet) such as Helvetica, Univers or Gill Sans, but make sure there is clear dis-

tinction between 1 (number) and l (lower-case ell) on all diagrams and maps. Keep the number of sizes of lettering used on any one figure to a minimum.

Fine stippling does not reproduce well and neither do extreme light and extreme dark tones. Ornamentation and symbols should, whenever possible, be explained *on the diagram*. If detailed explanation is required, use meaningful abbreviations on the diagram and give the full explanation in the caption (see also under 'Legends' below). Remember to remove any superfluous symbols or names inherent from a previous use of the illustration (see below under 'Reuse of illustrations: a warning').

Text and names

Ensure that text on diagrams conforms with that used in the text. Be particularly careful about correct (authorised) spellings; for example, Ringkøbing Fjord not Ringkøbing F. and Prinsesse Ingeborg Halvø not P. Ingeborg Halvø. Pay special attention to Faeroese and Greenlandic place names. Remember that place names of water or ice features are *always* in italics (see 'Use of italics', p. 53).

Scale and coordinates

Maps must include a metric scale; use lower-case letters, e.g. km not Km (see under 'The SI system', p. 56). Any regional maps, e.g. main map outlining the position or location of the study area, must have coordinates of latitude and longitude. Where a sketch map is rotated in relation to north upwards and has no coordinates, a north arrow is obligatory. For maps covering a larger area the type of projection should be indicated.

Legends

An elementary point, but one often overlooked, is that a legend must explain *all* symbols, ornaments or colours shown on the illustration. Naturally, a legend can be supplemented by information in the caption to make the explanation complete, *but avoid explanations in the caption of what 'shading' or 'cross-hatched' symbols represent.* All symbols should be graphically represented in a legend on the figure. Avoid also using numbered boxes in a legend with explanation in the caption.

Most legends are an integral part of a line drawing, i.e. placed within the illustration area or below any frame. In some cases, common legends are practical, for example in sets of standard illustrations such as stratigraphic columns that occur throughout the text. A common legend can be placed either at the first relevant illustration (see *Geology of Denmark Survey Bulletin* 36, figs 5, 13) or as a separate plate (see *Geology of Greenland Survey Bulletin* 174, plate 1).

Reuse of illustrations: a warning

Computer-generated illustrations at GEUS are kept in data files. These are available for reproduction in facsimile or in modified form. Electronic processing makes reuse easy; cropping and modification are routine. But this routine can be fraught with danger!

Unfortunately, illustrations are not often preserved with their original captions. Thus, unless authors (or draftspersons) specifically check the original usage, there is ample scope for misuse. For example, a map showing lands in other than present-day geography can be easily used out of context (see under 'Maps and reconstructions', p. 35). A legend explaining an original map version can be inadequate or misleading in relation to the modified version. Composition of illustrations, and their legends need qualified input; authors should not leave geological assessments to draftspersons.

Also, symbols used on one version of an illustration may become obsolete with reuse of the figure in another context. All superfluous symbols must be removed.

Colour diagrams and photographs

Colour diagrams and photographs are not automatically accepted. Since the scientific series are based on black and white text illustrations (see p. 39), use of colour for each photograph or diagram must be argued for independently with each submission. Seek editorial help about colour production early on in the planning of a publication.

However, in some special volumes like *Review of Greenland activities* colour is an essential part of the presentation. When requested, for line drawings with colour, colour separates should be provided for each colour with marginal registration marks.

Preparation of diskettes

Separate diskettes should be prepared for the main text including figure captions, etc., and any illustrations. Tables included on the text diskette must form a separate file.

Computer diagrams should be saved in EPS or TIFF format and should be clearly marked with contents (see under 'Diskettes at resubmission', p. 21). If other formats are to be used, contact the editorial office beforehand. Remember to supply any linked image files.

Photographs – black and white (half-tones) and colour – submitted as computer files in EPS or TIFF format should ideally have a resolution in reproduction size of 300 dpi (but always at least 233 dpi) and a pixel depth of at least 8 bits. Line drawings that are scanned should have a resolution of 1000 dpi. Colour photographs that are to be reproduced in black and white *should not be scanned* in colour; detail is lost on conversion to black and white. Always use a filter to give sharpness, and scan in 'Sharp Black and White Photo / Sharp Black and White Drawing / Sharp Million of Colors'.

Part 5. International conventions, codes and systematics

All scientific writing follows specific conventions and many codes are now routine parts of geological description, e.g. the order of elements in a chemical analysis (see p. 38); other codes are established but not universally adopted. Each discipline of earth science has its own international codes and procedures and the various Subcommissions of the International Union of Geological Sciences (IUGS) dealing with systematics, report periodically, e.g. see Harland *et al.* (1990), Le Bas & Streckeisen (1991) and Salvador (1994) and references therein. In this handbook, only three fields are treated, viz. stratigraphy, palaeontology and structural geology. The basic divisions of geologic time are dealt with under 'Stratigraphy'.

Stratigraphy

While it is obvious that geologic time is not described in metres, nor strata measured in years, many authors apparently have difficulty in expressing the fundamental differences between time and rock divisions. Thus, a review of the main units used in stratigraphical work is given below. In any case, before embarking on any stratigraphic description, an author must consult a standard reference work dealing with one or more relevant aspects, viz. chronostratigraphy, lithostratigraphy, biostratigraphy and magnetostratigraphy. Of the many stratigraphic guides and codes of nomenclature, procedure and systematics, (e.g. NACSN 1983; Owen 1987; Harland *et al.* 1990; Whittaker 1991), the most recent recommended is the 'International stratigraphic guide' edited by Salvador (1994).

Some basic units

Five standard units are listed here. It should be noted that the first – the basic unit of geologic time – is not strictly a stratigraphic unit (see Salvador 1994, also for other units, zones, etc.).

1. *Geochronologic units* are the fundamental divisions of geologic time. These units are non-material (intangible), and mainly part of a hierarchical system; time being determined by geological method (see Table 2, p. 44). They can be subdivided formally or informally, see under 'Capitalisation and subdivision of units' (p. 45).

2. *Chronostratigraphic units* are packages of rock formed during a specific interval of geologic time; as such they are the tangible equivalents of the geochronologic units (see Table 2) and likewise can be subdivided formally or informally. Chronostratigraphic units are limited by isochronous horizons.

3. *Lithostratigraphic units* are packages of rocks defined on the basis of their observable lithological characteristics. They can be either formal or informal; there is a conventional hierarchy in formal lithostratigraphy, i.e. from 'Supergroup' to 'Bed' and if volcanic,

'Flow'. All formal units must have initial capitals, e.g. the Brent Formation of the Central Graben Group of the North Sea (see *Geology of Denmark Survey Bulletin* 36), while informal names do not, e.g. the Cigar debris flow (unit) of the Lower Cambrian sequence of the Franklinian Basin (see *Geology of Greenland Survey Bulletin* 179). When a fossil name forms part of a lithostratigraphic unit, it is *not italicised* in a formal unit, e.g. Productus Limestone Member, only in informal units, e.g. the *Olenellus* bed.

4. *Biostratigraphic units* are packages of strata defined on the basis of their fossils and bounded by the biogeographic distribution and vertical ranges of the fossil taxa. The term 'biozone' is an alternative name. In all biozones the names of fossils are italicised, e.g. *Uptonia jamesoni* biozone or more simply the *jamesoni* zone (see also below under 'Chronozone, chrons and biozones').

5. *Magnetostratigraphic units* (or magnetozones) are packages of rock with peculiar magnetic characteristics enabling differentiation from adjacent units. See Salvador (1994) for other types of magnetic units.

Table 2. The fundamental geochronologic and chronostratigraphic divisions illustrating the time–rock couplet and its hierarchy

Geochronologic unit (time)	Chronostratigraphic unit (rock)	Example
Eon	Eonothem	Phanerozoic
Era	Erathem	Mesozoic
Period	System	Triassic
Epoch	Series	*Early or †Lower Triassic
Age	Stage	Griesbachian
Subage	‡Substage	Ellesmerian
§Chron	§Chronozone	†Ophiceras Zone

* geochronologic unit
† chronostratigraphic unit
‡ no consistency in formality at this level (see 'The substage level: a warning', p. 46)
§ not part of the basic hierarchy

Chronozones, chrons and biozones

The *chronozone* is a formal chronostratigraphic unit of unspecific rank, and therefore not part of the hierarchy of chronostratigraphic units (see Table 2). It is an equivalent of the *chron* that represents the interval of geologic time during which the chronozone was formed. The fact that a chronozone can have the same fossil name as a biozone, has created confusion in the literature. One point of uncertainty is caused by the use of the single, unqualified word 'zone' or 'Zone' instead of the full name 'chronozone' and 'biozone'. Obviously, the chronozone that is based on the range of a certain taxon must be readily distinguished from the biozone that is based on the range of the same taxon (i.e. taxon-range zone; see Salvador 1994, p. 83). One way this can be achieved is by dropping italic text in names of chronozones, as in the system of Callomon (1984) that has been used successfully in Jurassic stratigraphy both in Greenland and elsewhere. Thus biozones are written in italics and with lower-case 'z', e.g. the zone of *Uptonia jamesoni, Uptonia jamesoni* zone or

more simply the *jamesoni* zone, while biozone names used in a chronostratigraphic sense are not italicised and used with an upper case 'Z', e.g. Jamesoni Zone.

In Survey publications, it is essential that all terminology is unambiguous. This can best be achieved by bringing an explicit statement on the nature of the terminology used, and for maximum emphasis, preferably under a heading.

Geochronologic and chronostratigraphic units, and the time–rock couplet

Geochronologic units and their corresponding chronostratigraphic units composed of actual rock form the so-called time–rock couplet (see Table 2). While adopting international codes, the Survey has no stringent policy for enforcing new recommendations about time and rock divisions. Thus, while Early, Middle and Late Proterozoic are still used in some Survey publications, a convenient transition is taking place in the use of Palaeo-, Meso- and Neoproterozoic. Likewise, the name Tertiary is for convenience still functional within the Survey, although authors and editors should note the recent discarding of this term and, wherever practical, use the internationally recognised Periods: Palaeogene and Neogene. As a start to conformation, new Survey maps of the national map sheet coverages will adopt the internationally recognised units.

GEUS scientific publications deal with geographically widely-separated countries and so, in describing Danish and Greenlandic geology, there is a need for both European and North American terminology. For example, the Carboniferous, and its North American bipartite equivalent Mississippian and Pennsylvanian, can be used freely and it can be practical to use other North American terms in describing geological units that are common to Canada and Greenland (e.g. Aphebian, Helikian and Hadrynian).

However as stated in Part 6 (p. 50), English rather than American spelling is preferred in GEUS publications. Hence the accepted usage of dual-spelt Eras is: Archaean not Archean, Palaeozoic not Paleozoic and Cenozoic rather than Cainozoic.

Capitalisation and subdivision of units

Initial capital letters are used only when referring to *formally-defined* geological divisions whether they be geochronologic, chronostratigraphic, lithostratigraphic or other (see below). Uncapitalised words are used for all other (less precise) descriptions. Thus when an initial capital is used, precise definition of the unit is implied.

Where no authorised name exists, the position within a unit can be indicated by the use of adjectives, viz. the words 'early, middle/mid- and late' apply to geochronologic (time) units while 'lower, middle and upper' apply to chronostratigraphic (rock) units (Table 2). 'Lower' and 'early' etc. are *precise equivalents* and they can be used *formally or informally.* Combined words are permissible, so that the terms 'upper Lower' and 'lower Middle' refer to informal subdivisions of formal chronostratigraphic units (see examples below); 'late Lower' and 'lower Late' are unacceptable.

Thus, Lower Jurassic refers to the Lower Jurassic Series, whereas lower Jurassic refers in an unspecified sense to the lower part of the Jurassic Series. The term Late Jurassic refers specifically to the youngest Jurassic Epoch composed of the Oxfordian, Kimmeridgian and Volgian Ages, while late Jurassic refers informally to any part of the same Epoch. The informal term lower Middle Jurassic refers to the lower part of the Middle Jurassic System, i.e. the Aalenian Stage with or without part or all of the Bajocian Stage.

Positions within geochronologic and chronostratigraphic units can also be expressed by other informal words, e.g. 'earliest/lowermost' and 'latest/uppermost' that refer to the oldest and youngest parts of time–rock divisions. The word 'basal' can also be used, e.g. basal Cambrian, but avoid such ungrammatical phrases as 'top Cambrian' or 'end Cambrian'.

The words 'lower, middle and upper' can also be used with lithostratigraphic and biostratigraphic units, normally in an informal sense, e.g. lower Belemnite marls, upper *jamesoni* zone, and less commonly in a formal sense, e.g. Upper Carboniferous Limestone.

The substage level: a warning

At substage level, the situation regarding formality is less clear due to on-going defintion of substages. But the rule is the same, viz. where formally defined, use capitals but where informal, use lower-case. The responsibility for identifying current status of the substages lies with the author(s), although it is acknowledged that it can be difficult to keep track of the latest decisions of the various Subcommissions. However, if in doubt, always consult a biostratigrapher working on the stratigraphic level in question.

Time–rock divisions: some examples

1. The rocks of the Jurassic System were formed during the Jurassic Period.
2. The strata of the Upper Jurassic Series were laid down in the Late Jurassic Epoch.
3. The middle to upper Jurassic sequence contains faunas of at least Bathonian and Oxfordian ages.
4. In early Jurassic time several new species appear.
5. The lower Middle Jurassic includes Aalenian and Bajocian rocks.
6. The youngest Jurassic rocks present are of probable early Callovian age.
7. The *Cardioceras cordatum* biozone (or zone) belongs to the lower part of the Oxfordian Stage.
8. Ammonite fragments were determined as belonging to the Pliensbachian Jamesoni Zone.

And, as an example of an all-to-common blunder: The sediments were dated as *upper* Maastrichtian on the basis of dinoflagellate cysts.

Formal lithostratigraphy

In formal lithostratigraphy, the following headed sections are obligatory.

1. Unit name with rank: Supergroup, Group, Formation, Member, *Bed.
2. Status of unit name: new, revised, redefined.
3. History.
4. Name: derivation of.
5. Distribution.
6. Type area or type locality: including reference sections.
7. Thickness.
8. Lithology or dominant lithology.
9. Fossils (can be combined with 12).
10. Boundaries (can be combined with 11).
11. Correlation.
12. Geological age.
13. Subdivisions.

* If volcanic, the formal unit is 'Flow'; see under 'Lithostratigraphic units', p. 43.

Information in some sections may be minimal, e.g. if no fossils are known, report this, or if no correlation is established and none can be suggested, say so. Other sections than those above are found in the literature in formal descriptions, e.g. 'Geomorphic expression and colour', 'Depositional or volcanic environment' and 'Facies association'. The former can be a very useful addition to the objective description of a stratigraphic unit, but the following sections, essential in basin analysis, are interpretative and therefore not obligatory in the establishment of stratigraphic units.

Abbreviations

In formal lithostratigraphy all unit names must be written in full. However, some acceptable abbreviations are SGp (Supergroup), Gp (Group), Fm (Formation), Mb (Member), Cgl (Conglomerate), Lmst (Limestone), Mdst (Mudstone), Sst (Sandstone), Sh (Shale), Slst (Siltstone). These terms can be used to advantage in illustrations and tables, but in the text they can only be used sparingly and when explained under a heading such as 'Abbreviations used in this paper'. Note that none are followed by a full stop.

Lithostratigraphic schemes

Of all the diagrams that are necessary in lithostratigraphy in connection with the establishment of new units, the most useful for the reader in understanding the scope and nature of the stratigraphic revision is a correlation chart showing the relationships between old and new usage. Such accounts must contain such a scheme; see *Geology of Greenland Survey Bulletin* 173, fig. 3; 174, fig. 6; 178, fig. 3; 179, fig. 7.

Palaeontology

In all nomenclatorial matters the international codes of Zoological nomenclature (ICZN 1985) and Botanical nomenclature (ICBN 1994) should be followed. All section sub-

headings should include the rank and name of the taxon, its author(s) and date of publication. Reference should also be made to the plate and figure number(s) in which specimens are illustrated.

The information should be positioned as below, arranged here in the bulletin column width of 8.2 cm and flush left.

Systematic palaeontology

Class Oisteichthyes Latreille 1832
Subclass Actinopterygii Sars 1932
Family Cleithrolepidiae Wade 1935

Genus ***Dipteronotus*** Egerton 1834

Type species. *Dipteronotus cyphus* Egerton 1854.

Diagnosis. Deep-bodied fish in which the dorsal side is marked with a hump.

Remarks. Prominent dorsal ridge scales midway between the skull and dorsal fin..... .

Dipteronotus cyphus Egerton 1854
Plate 1, figs 1a, b, 2; Fig. 9

1854 *Dipteronotus cyphus* Egerton, p. 369, plate 2, figs 11, 12
1910 *Dipteronotus cyphus* Egerton – Woodward, p. 322
1911 *Dipteronotus cyphus* Egerton – Hutchinson, p. 321, plate 13, fig. 3; text-fig. 5
1912 *Dipteronotus cyphus* Egerton – Gall *et al.*, pp. 7–8, plate 5, fig. 1; plate 6, figs 7–11

Description. A *Dipteronotus* with 10–13 elongate, spinose, ridge scales in front of dorsal fin; ventral ridge scales similar, but smaller than dorsals.

Note that reference to plates is given in full (do not abreviate to Pl.) and is placed before any reference to figure(s) (written as fig. or figs). Otherwise, the order of citation of figures, plates, etc. is as given in Sønderholm *et al.* (1998, p. 28), apart from the use of a comma (instead of hyphen) in composite plates, i.e. plate 2, figs 1a, b *not* plate 2 - figs 1a, b.

A description of a new taxa (species) should contain the following information: reference to the illustration of the holotype, derivation of the name, type locality and stratum, holotype, diagnosis, description, discussion, occurrence, material and repository.

Type specimens and all others figured or cited must be furnished with a museum catalogue number (see under 'Palaeontological illustrations', p. 34). Authors should note that GEUS is obliged to deliver all holotypes and other illustrated material from Denmark, Greenland and the Faeroe Islands to the Geological Museum, Copenhagen. This institute is the national repository for palaeontological material.

Note that words and abbreviations from Latin used in systematic palaeontology must be in italics, for example *emend., pars, partim, sensu lato, sensu stricto*.

Structural geology

Structural terminology is free of rigid formal conventions for the most part; thus one can write equally correctly *East Greenland Caledonides, East Greenland Caledonian fold belt* or *East Greenland mobile belt*. While some journals automatically capitalise the initial letters of such terms, GEUS recommendation is not to use capitalisation in cases where the name is *not a rigid formal definition*.

The same argument applies to many names given to dislocations, e.g. *Kuugannguaq–Qunnilik fault*, *Kap Cannon thrust* or *Melville Bugt graben*. Capitalisation of the initial letters implies a formality in usage which many terms do not have, although again some journals will automatically capitalise. Other names, both formally defined and otherwise, can be so entrenched in the literature that capitalisation must be retained, e.g. Danish Central Graben of the North Sea and Jameson Land Basin.

There will be cases where authors wish to capitalise in order to emphasise divisions within a region. Thus Dronning Louise Land is conventionally described with reference to three main tectonic units, referred to as the *Western Foreland*, *Imbricate Zone* and *Eastern Hinterland*, which was also the usage of the first workers in the region. Thus in general a certain flexibility in terminology will be accepted in the GEUS scientific series *but terms must be used consistently*.

It is often useful to introduce abbreviations for frequently used terms, e.g. *Ringkøbing–Fyn High* (RFH). However, *use abbreviations sparingly* as over-indulgence can be irritating to the reader if constant checking back is required for explanation. As with other types of abbreviation, always spell out in full on initial usage.

Part 6. English language usage

The GEUS scientific series are written for an international audience; the English language used should be concise, clear and accurate. However, the details of English grammar are not elaborated on in this handbook, and the reader is referred to one of the modern versions of Fowler's classical handbook on the correct use of English (e.g. Fowler 1998). Given below are some general remarks relevant to geological writing, with some tips and traps.

As mentioned on p. 19 under 'Language check', all manuscripts delivered to the scientific series must have passed through English correction before submission (Fig. 2).

Spelling and word usage

Spelling and word usage in English is a vast subject. Authors should consult a modern dictionary of English spelling; we recommend versions of the *Oxford dictionary* (e.g. Thompsen 1995; Pearsall 1998) or the *Collins dictionary* (e.g. Sinclair 1987, 1994).

The endings '-ise', '-isation' are preferred. If the endings '-ize', '-ization' are used it is important to note that there are exceptions which are never with 'z', e.g. advise, comprise, compromise, devise, disguise, exercise, incise, revise, supervise, surmise, surprise.

Many words of non-English origin are now fully integrated into the English language. However, others retain diacritical marks or accents, e.g. décollement, mélange, résumé.

English versus American spelling

British English rather than American English spelling is preferred in GEUS scientific publications, but both are acceptable. The vital point is: be consistent throughout the work and ensure the same spelling in diagrams and text.

Here are a few examples of variable spelling: English spelling is aeolian not eolian, analogue not analog, aluminium not aluminum, amygdale not amygdule, Archaean not Archean, Cenozoic not Cainozoic, centre not center, dyke not dike, favour not favor, fulfil not fulfill, gauge not gage, metre not meter (note that in British English *meter* is used for instruments, e.g. gravimeter, radiometer), mould not mold, palaeo- not paleo- as in Palaeozoic/Paleozoic, programme not program, rigour not rigor, sulphur not sulfur and vapour not vapor.

Glossary

Of the many dictionaries of geological terms available, two are recommended here, viz. *A dictionary of earth sciences* (OUP 1999) and *Glossary of geology* (Jackson 1997), which

respectively have preference for English and American spellings. There may be contradictions between the spellings of these two sources and the glossary of recommended GEUS spellings which is available from the editorial office; for example 'groundwater' in the glossary is a single word like 'groundmass', i.e. not ground-water or ground water.

Use of hyphen, en-rule dash and slash

The GEUS scientific series make use of the hyphen (Danish: bindestreg), the en-rule dash (Danish: kort tankestreg) and the slash (Danish: skråstreg), but not the em-rule dash (Danish: lang tankestreg) which can be appropriately substituted by an en-rule dash with a space on each side (see examples in the text, e.g. in 'Preface', p. 3).

Hyphen (Danish: bindestreg)

Hyphens are used literally 'to bind together' elements, often to form a new identity, e.g. twenty and four = twenty-four or south of east = south-east. Eight specific uses, with examples, are given here.

1. Used to join compound adjectives, e.g. cigar-shaped inclusions, fine-grained rock, fining-upwards sequence, grey-green siltstone, high-grade gneiss, island-arc setting, light-brown metasediment, thin-bedded sandstone, well-defined contact. In places there will be a need for hanging hyphens, e.g. fine- to coarse-grained syenite, major- and trace-elements analyses, low- to high-grade metamorphism, but keep these to a minimum.
2. Used following a prefix, e.g. co-author, mid-Atlantic, non-aligned, para-autunite, pre-Quaternary, post-date, post-Caledonian, re-drill, semi-precious, sub-basin.
3. Used for joining mineral or element names together in descriptions of rocks or assemblages, e.g. arsenopyrite-pyrite-sphalerite assemblage, garnet-bioite-staurolite schists, Zn-Pb mineralisation, or in chemical methods, e.g. K-Ar dating.
4. Used in compass directions, e.g. south-east, south-south-east, north-western outcops, *but* no hyphen in NW–SE (i.e. not a new identity, see below under en-rule dash).
5. Used to join some words that are commonly used together, e.g. half-life, layer-cake, left-handed, make-up, mock-up, pull-apart. Commonly these words are in a state of transition, i.e. starting as two words and, with time, ending as one.
6. Used in some geological constructions like breccio-conglomerates, Cambro-Silurian (but Cambrian–Silurian, see below).
7. Used in numbers and fractions, e.g. sixty-two, three-quarters, two-fifths.
8. Used at the end of a line to indicate broken word. Do not use these in manuscript preparation (like this) since on rearrangement of text they will be unnecessarily retained out of place.

Some authors might find it more convenient to write manuscript drafts using hyphens throughout, and then convert where necessary to dashes using the computer's 'replace' option ('søg og erstat').

En-rule dash (Danish: kort tankestreg)

The en-rule dash is longer than the hyphen. Its common uses are as a substitute for the word 'to' or 'between' in ranges, and linking items that retain their identities. Some common usages are given here. In Microsoft WORD, an en-rule dash is generated by pressing Ctrl and the '–' key on the numerical part of the keyboard.

1. Used in ranges of numbers and dates, e.g. 30–40 km apart, 5–8 m thick, pages 24–58, 4000–5000 samples, (Figs 1–5), in the period 1941–1968, 72°–74°N.
2. Used in geographical directions that are compound, e.g. NW–SE, E–W, WNW–ESE.
3. Used when the first part of a compound does not modify the second part; the dash more or less substitutes the word 'and', e.g. depth–time curve, gas–liquid chromatography, granite–greenstone belt, *P–T* conditions.
4. Used to connect proper nouns, e.g. Farum–Værløse–Ballerup area, Pituffik–Siorapaluk region, Køge–Roskilde road, FeO–MgO–Al_2O_3 triangular diagrams.
5. Used to indicate a geologic time range, e.g. Late Riphean – Vendian*, Cambrian–Silurian, Palaeozoic–Cenozoic, Palaeogene – early Neogene*.
6. Used as a substitute for an em-rule dash (Danish: lang tankestreg), i.e. to accentuate a parenthetic break stronger than a pair of commas or parentheses.

* Note that where the link is between composite parts, a space must be placed on either side of the dash, e.g. Køge Bugt – Fakse Bugt coast, Inglefield Land – northern Washington Land region or Lower Palaeozoic – Upper Mesozoic, thus indicating that it is *the composite parts that are being linked, not just the two words flanking the dash*.

Slash (Danish: skråstreg)

Of the many variations of slash or oblique marks only one type is recommended here, viz. /. There are many uses of the slash which also appears in some abbreviations, e.g. c/o (care of). Five other uses are

1. As a link between abbreviations and in word couplets, in places as a substitute for 'and', e.g. DGU/GGU work, GEUS/DLC programme, GPS/UTM position, USA/UK standards, lamprophyric/kimberlitic dyke swarms, melting/freezing model, latitude/longitude, Nuuk/Godthåb, Triassic System/Period.
2. In number identifications, for instance of boreholes, profiles, traverses, etc., e.g. Challenger well 104/13-1, GGU/95-17 seismic line, NASA image 546/01/8420.
3. In ratios, e.g. Mg/Fe, *P/E* ratio, Rb/Sr ratio.
4. In expressions of concentrations or rate, e.g. 100–200°C at 4.5°C/min; 27 g/ton; 6 s/m; kg/m^3.
5. In mathematical expressions for division, e.g. K = k/(1-NK).

Quotation marks

Both single and double quotation marks (Danish: anførselstegn) are used in GEUS publications (see examples in this report). *Double marks* are used for direct quotations, e.g. .....

according to LaFollette (1992, p. 119) "To qualify as true peer review, a process must contain some possibility of rejection". Note that the page number is essential for the reader to find the quote easily. *Single marks* are used for all other forms, e.g. ..... the gneisses can be classified as 'volcanic-arc granites', some are 'within-plate granites'. A common use of single quotation marks is to distinguish informal place names from authorised ones, e.g. ..... the 'Monument' is an inselberg-like mountain rising above the plain.

Use of italics

In the above section, 'Double marks' and 'Single marks' are in italics. This illustrates one use of italics, viz. for emphasis. Some Latin words and abbreviations are also italicised (see 'Abbreviations and italics', p. 55). Six other common uses of italics are listed below. For a full treatment, see Council of Biology Editors (1994).

1. In palaeontology the use of italics is obligatory for all scientific names of genus, species, subspecies and variety. Higher taxon are not italicised.
2. For official names, for example of aircraft, ships, expeditions as well as titles of books, theses, papers, etc.
3. Single letters representing quantities or a variable are put in italics in equations and text, e.g. *x*, *y*.
4. International crystallographic symbols, for example in crystal lattice nomenclature: *Cm*.
5. In nomenclature of organic chemistry, the use of italics follows certain rules, for instance symbols for atoms being substituted are put in italics, e.g. *N*-methylothanomine.
6. On all maps, the names of water and ice features are always in italics, i.e. seas, fjords, lakes, rivers, glaciers, ice caps, etc.

Compass points

The points of a compass are conventionally abbreviated to capitals but without stops, i.e. N, E, NE, NNE, etc.; such forms are well suited to use in illustrations. However, used frequently in the main text they can disrupt the flow, and in general descriptions they are discouraged (see below). Thus, in the standard text write in full and do not use capitals, e.g. "The sandstones crop out north of the church".

In formal names or for a well-defined region, capitals are naturally used, e.g. North Atlantic, Western Australia, Northern Ireland, North-West Greenland, Eastern Finmark, South Africa, but not in informal use, e.g. southern England, northern Germany, central Jutland.

The parts of any *single* direction are joined by hyphens, e.g. 'the south-eastern side'; 'towards the south-south-east'; not southeastern and southsoutheast. In *double* directions, use an en-dash, e.g. N–S (see next paragraph).
In all cases where the sense is 'to' or 'between' an en-rule dash is used, e.g. 'E–W striking rocks', 'east–west striking fault' or NE–SW lineament. For other uses of hyphens and en-rule dashes, see above under the sections so named (pp. 51–52).

In technical passages, for example on structural geology, and in figures, tables, etc. abbreviations are practical. With care, such abbreviations can also be combined in the text with some directions written in full, e.g. "...the strata strike NE–SW; about 100 m *west* of the road they curve *eastwards* so that *south* of the castle they strike to the SE". Use of W for west, E for eastwards and S for south would spoil the prose. Naturally, where precision is also required, use others forms, e.g. "..... the fold axis plunges SW (more precisely to 300°)".

Abbreviations

Principles

Only use recognised abbreviations; if you introduce an abbreviation for a local name or term, e.g. of a project that reoccurs in the text, make sure it is explained at first usage. The principle is: if in doubt about clarity don't abbreviate. In many cases, abbreviations do not save space when seen in respect to the entire text. But misuse can cause ambiguity.

If the text contains several abbreviations it is helpful to gather them together under a heading like 'Abbreviations used in this paper'.

Explanation of abbreviations is of paramount importance in illustrations and tables; even if explained in the main text, tables and other diagrams should be self-explanatory.

Many abbreviations are commonly used in connection with digits, e.g. 15 kg or 200 km, and there are set conventions about the use of italics and the positioning of abbreviations (see below). For spacing with abbreviations, see under 'Space and no space with abbreviations, etc.', p. 58.

When to abbreviate

Remember, frequent use of abbreviations lends for disjunctive prose; use them sparingly. A sentence should never commence with an abbreviation, like 'E.g.'; write in full 'For example'. The word 'Figure' is written out at the beginning of a sentence in the text, but elsewhere can be abbreviated to Fig. It is always abbreviated to Fig. at the start of a figure caption (see under 'Figure captions', p. 32).

Many other examples could be mentioned; one rule concerns the use with numbers. For example, write kilometres or per cent out in full when not preceded by a digit in the text, e.g. "it is situated a few kilometres from here" or "how many per cent is unknown", but abbreviate or use the relevant symbol following a digit, e.g. 15 km or 23%.

Abbreviations and italics

Convention determines that some Latin abbreviations are given in italics, for example: *ad inf., ad loc., c., et al., et seq., ibid., loc. cit., op. cit.* Others are not, for example: cf., e.g., etc., i.e. and viz. The letters *P*, *T* and *E* standing for pressure, temperature and evaporation are also given in italics, e.g. *P–T* conditions. Acronyms are seldom, if ever, italicised.

Abbreviations and full stops

There are no hard and fast rules for the use of full stops with abbreviations. Those of Latin derivation and many others have a full stop after each abbreviation, whether it consists of one or several letters, for example A.D., a.s.l., etc., *op. cit.*, p.m.

Some abbreviations are followed by a full stop in the singular form, but not in the plural if the last letter of the word concludes the abbreviation. Examples: ed. and eds (editor(s)); fig. and figs (figure(s)), no. and nos (number(s)), vol. and vols (volume(s)). Others have a full stop in both the singular and plural form, e.g. p. and pp. (page(s)).

Degree titles retain the full stop in GEUS style, e.g. B.Sc., cand. mag., Ph.D.

Other abbreviations, particularly acronyms, have no full stop, e.g. MORB, NASA, SEATO, UK, USA, ppb, ppm. This also applies to units of measure, e.g. cm, m, kg, km, l, wt; such abbreviations have no plural forms.

Abbreviations and position

Abbreviations that are part of numerical expressions usually have fixed positions. Thus units of measure follow the numbers, e.g. 15 kg and 25 km, while others, such as monetary symbols, usually precede the amount, e.g. £15 and $10.

The abbreviation A.D. (Anno Domini) precedes the numeral, e.g. A.D. 325, whereas B.C. (Before Christ) follows the numeral, e.g. 55 B.C. However, when the date is spelled out, *A.D.* usually follows the date, e.g. "In the second century A.D. .....".

Acronyms

Almost all acronyms must be fully explained to the reader. The most practical way is to qualify in parentheses the first time the term is mentioned in the main text, e.g. the Danish Lithosphere Centre (DLC) and the Danish Polar Center (DPC) (note variable official spelling of the word centre), after which the acronyms can be used. Geological acronyms like MORB for mid-ocean ridge basalt and PGE and PGM for platinum-group elements and minerals, although used internationally, should also be explained in the Survey's scientific series the first time they are mentioned.

Few acronyms are so well known that explanation would be superfluous. Three examples, all based on the word 'united', are UK, UN and USA.

Do not use more acronyms than are absolutely necessary, otherwise the reader is continually turning pages to find explanations. Texts sprinkled with acronyms and other abbreviations are more difficult to read than 'clean' prose. In acknowledgements, always write out names in full.

Units and system of measure

The SI system

For all dimensional quantities international scientific publications use the metric system; of the variations that exist, the Survey uses the SI system (Système International) of units. Abbreviations are determined by the SI system of prefixes, viz. G (giga), M (mega), k (kilo), d (deci), c (centi), m (milli), μ (micro), n (nano), etc. to give Ga (gigayear), km (kilometre), mm (millimetre), etc. Note that Å and μ are not SI units; use nm and μm respectively. The recommended SI abbreviation for year is 'a' (for annum), thus Ma (megayear) stands for million of years.

In addition, other internationally recognised units can be used, for example bar and Kbar, although the recommended SI units for pressure are pascals (Pa). Any other, uncommon units and abbreviations must be explained.

Abbreviations of units of measure are not followed by full stops, and there is no plural form (see 'Abbreviations and full stops', p. 55).

Symbols and letters

Avoid ambiguous use of 'similar-looking' letters and symbols, e.g. O (character), 0 (zero) and ° (degree sign), 1 (one) and l (lower-case L; ell) and I (upper-case i); ' (single citation character) and ′ (minute character). Ensure that any Greek letters and other symbols are correctly used throughout. If a character is not available on the word-processor, write it by hand in pen in the margin; *do not type a substitute character* (Roman alphabet) which has later to be recognised and modified, e.g. w for ω (omega), ø for ϕ (phi), u for μ (mu), etc.

As a general rule leave a space between number and unit of measure, e.g. 10 kg, 55 Ma, 5 mm (see also 'Space and no space with abbreviations, etc.' p. 58). Units should only be abbreviated when preceded by a figure, e.g. 400 m, otherwise write 'hundreds of metres'.

Many illustrations and all maps need a scale. The word metres can be written in full but if abbreviated, use a lower-case m (not M); always abbreviate kilometres to km, not Km.

For multiplication do not use an alphabet letter but the symbol × with a space before and after, e.g. 3.25×10^3.

Less than (<), greater than (>), or about the same as (~) should only be used with a scaled measurement, e.g. > 1270 Ma or ~ 5 samples per km^2. Expressions of tolerance is in the form 80 ± 5°C and 1250 ± 50 Ma. Note in all these examples the space between symbol and digits (see 'Space and no space with abbreviations, etc.' next page).

The minus sign

A minus sign has the same length as an en-rule dash (Danish: kort tankestreg; in Microsoft WORD generated by pressing Ctrl and '–' on the numeric keyboard). Beware with –8 – –6, better to write –8 to –6 (+6 to –8). This also applies when the minus sign is in the potens.

No space is used with plus or minus when they are used to designate positive or negative values of numbers or variables, e.g. –2*x*, +13, –7.

Use of the ampersand

The ampersand (&) is a convenient symbol for 'and' in many parts of scientific writing, for example it is used in the GEUS reference style. It should never be used in running text or in titles or headings, but is preserved in quotations (see under 'Quotations', p. 29). It is commonly used in commercial names, such as publishing companies (e.g. Graham & Trotman and John Wiley & Sons), and therefore it must be retained in references.

Scales and numbers

As a general rule, in most cases numbering and scaled measurements should be given as figures, both in the running text and in lists, illustrations and tables, e.g. 5 kg, 10 Kbar, 15 persons, 90 analyses, 450 samples and 1500 km. Two exceptions: (1) numbers between one and ten are written in words, e.g. 'two analyses', 'ten persons', and (2) numerals that open a sentence are written in full, e.g. 'Thirty-six samples were used .....'.

Do not use commas in four-digit numbers, e.g. 1025 kg; for numbers above 9999, group digits in threes, e.g. 25 000, 250 000, 1 250 000. Retain the symbol ~ in tables, but not in the main text.

Note that in English text, a period or dot on the line is used as the decimal point, not a comma. *When quoting map scales do not use dots or commas but thin spaces*, e.g. 1:250 000 or 1:10 000.

Avoid contracting ranges, i.e. 4000–5000, not 4–5000, unless four (4) to five thousand is actually intended in which case it is safer to write it in full. Note use of an en-rule dash; see under 'En-rule dash', p. 52.

In fractions use a hyphen (bindstreg), e.g. three-quarters; in concentrations and rates use a slash (skråstreg), e.g. kg/m^3 and 10 s/m.

When indicating ranges in the text, use the word 'to' (not 'through to') to connect numbers, e.g. 'Samples 23 to 35 were analysed .....'.

Space and no space with abbreviations, etc.

The following list gives some of the more common occurrences of abbreviations, symbols, numbers, names and phrases in which doubt can arise as to spacing. Note also the use of italics, full stop, en-rule dash and slash.

Space	**No space**
c. 8	69°22′42″N
300 μ	1:20, 1:1000
6 kg	38°C
6 s/m (no space with slash)	4.5°C/min
10 m	4.5–6.0°C
50 ppm	35%
65 g/t (no space with slash)	vol.%
78 pp.	wt%
~ 15	kg/m^3
HI = 222	626–800, 1852–1909
10 000	*P–T*
1:100 000	*P/E*
> 20	Rb/Sr
55 ± 4 Ma	E–W, NW–SE
6 × 8	C.R.S. Thomson (NB: space before T)
northern Baffin Bay – Smith Sound	B.Sc.
middle Cambrian – lower Ordovician	M.Sc.
n.d. = not detected (NB: no space in acronym)	Ph.D.
n.a. = not analysed (NB: no space in acronym)	UK, USA
2 + 3 = 5	i.e., e.g.
–2 + –3 = –5 (NB: no space between minus and number)	Canadian–Greenlandic
	Cambrian–Ordovician

Dates

To avoid confusion, always write the month of the year in words and maintain consistency in the order of day, month and year. Use the form 25 March, 1996 (see also standard dates in references; Sønderholm *et al.* 1998, p. 24). Remember that your readers are world-wide and so it must be absolutely clear what is intended. To avoid misunderstanding, do not rely

on local convention. Note that Americans often use another convention which can be confusing to a European.

Coordinates

When giving a geographical position in coordinates, use traditional latitude and longitude, rather than a UTM position; see below for UTM.

Latitude and longitude

The words latitude and longitude can conveniently be abbreviated to lat. and long., but in most statements of position it is not necessary to use them because by convention lat. is placed first. Thus standard references are: 79º45′N, 18º50′W; 79º–81º56′N, 18º50′–25º00′W; 79ºN; 69º22′42″N.

Note (1) it is not necessary to use N and W more than once in any one position and (2) the use of en-rule dash (kort tankestreg) as substitute for 'to'. If the decimal system is used, the forms: 71.7071ºN, 53.0789ºW; 80º31.9′N, 65º25′W should be employed.

UTM coordinates

If cited, UTM (Universal Transverse Mercator) coordinates should be given as: 645820N, 455642W with zone and datum information as absolutely essential.

GPS (Global Positioning System)

It is not necessary with each geographical coordinate to state whether it has been obtained by GPS. If accuracy of position is important, explain the methods used in a relevant sentence or section. Avoid the tendency to mix the word GPS with UTM. GPS positioning handles both geographic and UTM coordinates.

Acknowledgements

Like its predecessor on bibliographic style, this report to authors and editors has been through several drafts over many months. We are grateful for comments from members of the publications committee: Niels Henriksen, Svend Stouge and Stuart Watt, as well as from Tony Higgins and Jon Ineson.

Of the reference works consulted for the compilation of this handbook, familiarity with the publication guidelines issued by the Geological Survey of Canada (Blackadar *et al.* 1980), the Geological Survey of Western Australia (Forbes 1991), the Council of Biology Editors (1994) and the Geological Society of London has been especially helpful.

Authors and editors are requested to contact the editorial office with any changes aimed at the improvement of this handbook.

References

Bates, J.D. 1988: Writing with precision: how to write so that you cannot possibly be misunderstood, revised edition, 226 pp. Washington, D.C.: Acropolis Books Ltd.

Bates, R.L., Adkins-Heljeson, M.D. & Buchanan, R.C. (eds) 1995: Geowriting. A guide to writing, editing, and printing in earth science, 5th edition, 138 pp. Alexandria, Virginia: American Geological Institute.

Blackadar, R.G., Dumych, H. & Griffin, P.J. (compilers) 1980: Guide to authors – a guide for the preparation of geological maps and reports. Geological Survey of Canada Miscellaneous Report **29**, 66 pp.

Butcher, J. 1993: Copy-editing: the Cambridge handbook for editors, authors and publishers, 3rd edition, 471 pp. Cambridge, UK: Cambridge University Press.

Callomon, J.H. 1984: Biostratigraphy, chronostratigraphy and all that – again! In: Michelsen, O. & Zeiss, A. (eds): International symposium on Jurassic stratigraphy, Erlangen, 1–8 September 1984, Symposium volume **3**, 611–624. Copenhagen: Geological Survey of Denmark (International Subcommission on Jurassic stratigraphy, IUGS).

Council of Biology Editors 1994: Scientific style and format. The CBE manual for authors, editors, and publishers, 6th edition, 825 pp. Cambridge: Cambridge University Press.

Dawes, P.R. & Glendal, E.W. 1997: Publications in English of the Geological Survey of Denmark and Greenland: the scientific series and other issues. Danmarks og Grønlands Geologiske Undersøgelse Rapport **1997/116**, 39 pp.

Donnay, J.D.H. 1995: Veritas vos liberabit: code of ethics in scientific work. Canadian Mineralogist **33(2)**, inside back cover.

Forbes, A.S. 1991: A guide for authors and editors of GSWA publications, 43 pp. Perth: Geological Survey of Western Australia.

Fowler, H.W. 1998: The new Fowler's modern English usage, 3rd edition, 896 pp. Oxford: Oxford University Press (Fowler's original text revised by E. Gower; the 1998 version is edited by R. Burchfield).

Glover, J.E. 1992: Style: an introduction to writing for geologists. Australian Institute of Geoscientists Handbook **1**, 54 pp.

Goodman, B.A. (ed.) 1997: GeoRef Thesaursus, 8th edition, 776 pp. Alexandria, Virginia: American Geological Institute.

Harland, W.B., Armstrong, R.L., Cox, A.V., Craig, L.E., Smith, A.G. & Smith, D.G. 1990: A geologic time scale 1989, 163 pp. Cambridge, UK: Cambridge University Press.

ICBN 1994: International code of botanical nomenclature, 389 pp. Königstein, Germany: Koeltz Scientific Books (adopted by the 15th International Botanical Congress; also Regnum vegetabile **131**).

ICZN 1985: International code of zoological nomenclature, 3rd edition, 338 pp. Berkeley: University of California Press (for International Trust; adopted by the 20th General assembly of the International Union of Biological Sciences).

Irvine, T.N. & Rumble III, D. 1992: A writing guide for petrological (and other geological) manuscripts, 46 pp. Oxford: Oxford University Press (for Journal of Petrology).

Jackson, J.A. (ed.) 1997: Glossary of geology, 4th edition, 769 pp. Alexandria, Virginia: American Geological Institute.

LaFollette, M.C. 1992: Stealing into print. Fraud, plagiarism, and misconduct in scientific publishing, 293 pp. Berkeley, California: University of California Press.

Le Bas, M.J. & Streckeisen, A.L. 1991: The IUGS systematics of igneous rocks. Journal of the Geological Society (London) **148**(5), 825–833.

NACSN 1983: North American stratigraphic code. North American commission of stratigraphic nomenclature. American Association of Petroleum Geologists Bulletin **67**(5), 841–875.

OUP 1999: A dictionary of earth sciences, 640 pp. Oxford: Oxford University Press (a revised edition of The concise Oxford dictionary of earth sciences, 1991; available March 1999).

Owen, D.E. 1987: Usage of stratigraphic terminology in papers, illustrations, and talks. Journal of Sedimentary Petrology **57**(2), 363–372.

Pearsall, J. (ed.) 1998: The new Oxford dictionary of English, 2152 pp. Oxford: Oxford University Press.

Resnik, D.B. 1998: The ethics of science: an introduction, 208 pp. London: Routledge.

Salvador, A. (ed.) 1994: International stratigraphic guide. A guide to stratigraphic classification, terminology, and procedure, 2nd edition, 214 pp. Boulder, Colorado: International Union of Geological Sciences and Geological Society of America, Inc.

Sinclair, J. (ed.) 1987: Collins Cobuild English language dictionary, 1703 pp. London: HarperCollins Publishers.

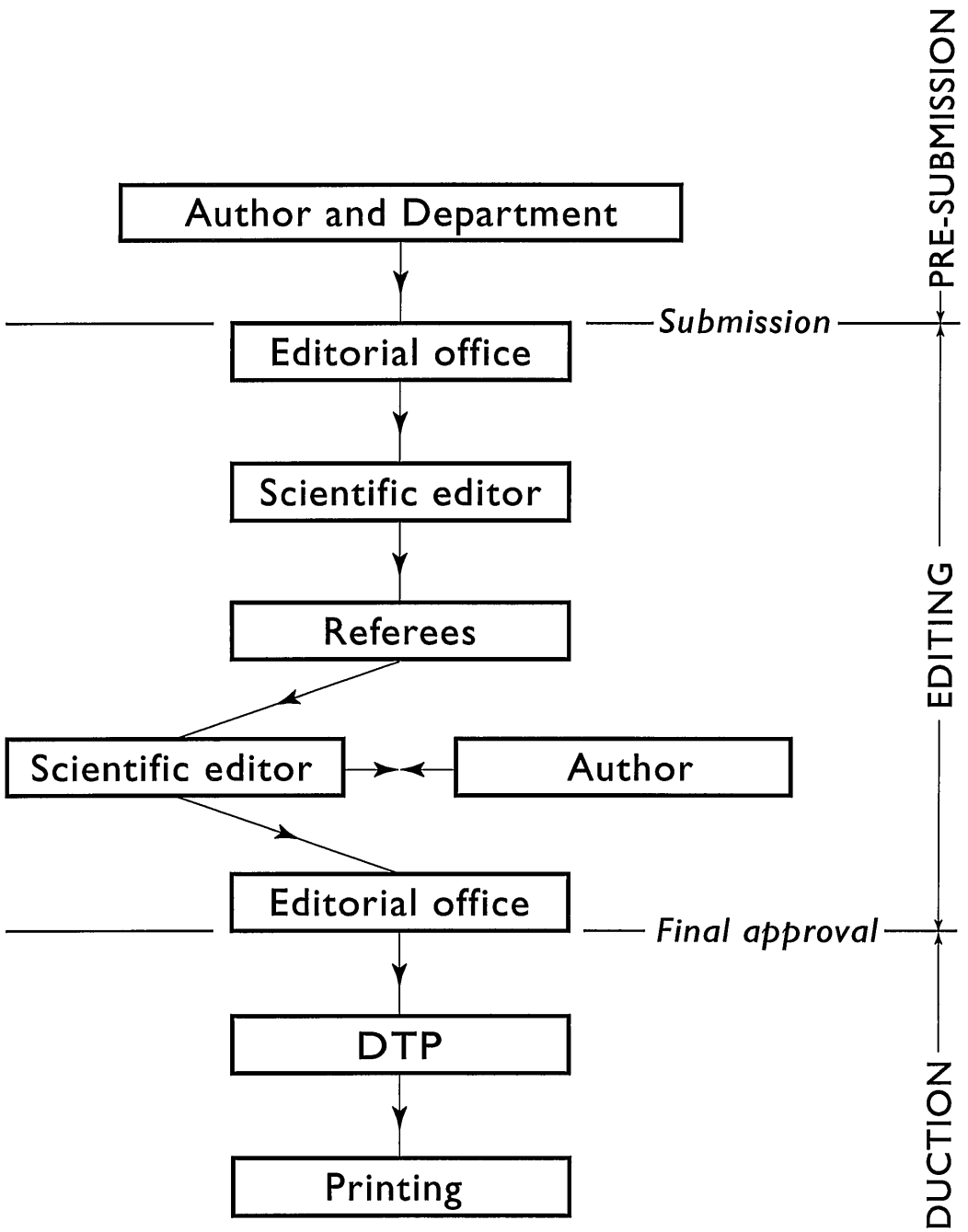
Sinclair, J. (ed.) 1994: Collins English dictionary, 1791 pp. Glasgow: HarperCollins Publishers.

Sønderholm, M., Dawes, P.R. & Glendal, E.W. 1998: A standard bibliographic style for GEUS' publications: a guide for authors and editors, 2nd edition. Danmarks og Grønlands Geologiske Undersøgelse Rapport **1998/53**, 52 pp.

Thompson, D. (ed.) 1995: The concise Oxford dictionary of current English, 9th edition, 1673 pp. Oxford: Oxford University Press.

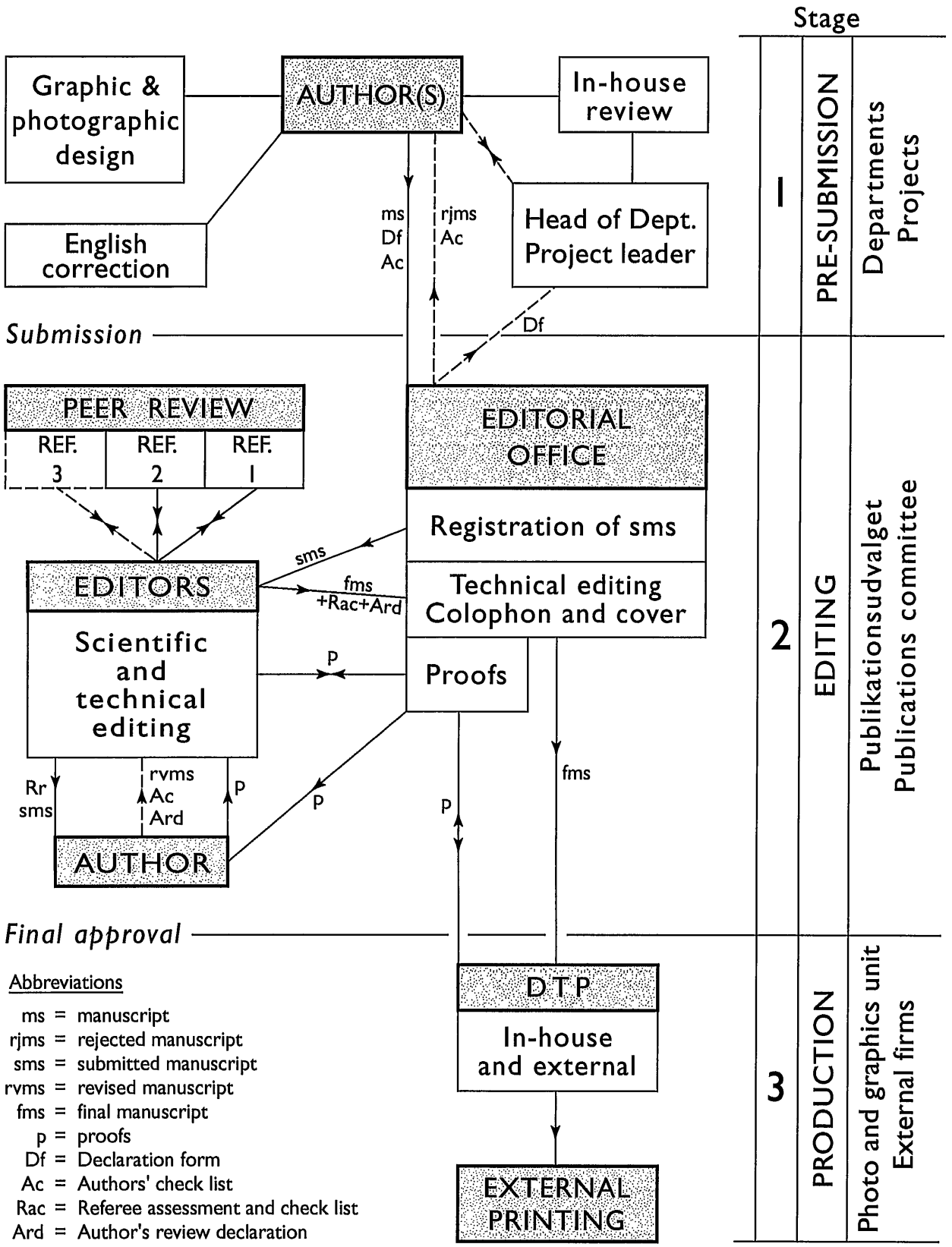
Whittaker, A. *et al.* (eds) 1991: A guide to stratigraphical procedure. Journal of the Geological Society (London) **148**(5), 813–824 (also Geological Society Special Report **20**).

General flow of manuscript



All manuscripts, including those for multi-article volumes such as *Review of Greenland activities*, are submitted through the editorial office.

Details of manuscript flow *



Abbreviations

ms = manuscript
rjms = rejected manuscript
sms = submitted manuscript
rvms = revised manuscript
fms = final manuscript
p = proofs
Df = Declaration form
Ac = Authors' check list
Rac = Referee assessment and check list
Ard = Author's review declaration
Rr = Review remarks to author

* Does not apply to map production or to *Review of Greenland activities*

→ Minimum path
⇢ Additional path

GO02.00-009-PRD/hz

Danmarks og Grønlands Geologiske Undersøgelse (GEUS)
Geological Survey of Denmark and Greenland

Declaration form

To be delivered at submission

To accompany manuscripts submitted to the scientific series: *Geology of Denmark Survey Bulletin, Geology of Greenland Survey Bulletin and Geology of Denmark and Greenland Map Series*

Series: _____

Title: _____

_____

Author(s): _____

Author declaration

Have any of the illustrations/photographs/tables been published previously or are in press, in internal or external publications, either wholly, in part or in modified form? Yes ☐ no ☐.
If yes, state figure/table numbers:

Previous sources must be clearly stated in the appropriate captions. Are they?

Permission to use copyright material (from all other sources than GEUS publications) is the authors' responsibility.

I declare that the contents of this paper are agreed on by *all* the authors.

_____ _____
First author Date

Leader declaration (may not be relevant to *some external* authors)

I declare that this manuscript has been critically reviewed at GEUS by _____ and that the comments raised have been acted on by the author(s). It does not contain confidential or classified information and all data sources are referenced adequately. The work as submitted is in GEUS style and suitable for publication in the GEUS scientific series with the changes that the editors might find necessary to meet international standards.

_____ _____ _____
Head of department or Project/Programme leader Date

Danmarks og Grønlands Geologiske Undersøgelse (GEUS)
Geological Survey of Denmark and Greenland

Authors' check list

To be delivered at submission and after any revision

To accompany manuscripts for the scientific series: *Geology of Denmark Survey Bulletin, Geology of Greenland Survey Bulletin and Geology of Denmark and Greenland Map Series*

Series: _____

Title: _____

_____

Author(s): _____

Manuscript

- 3 identical copies in GEUS style ☐
- Title page with keywords ☐
- Abstract with addresses ☐
- Table of contents ☐
- Complete text (no. of pages) ☐
- References in GEUS style ☐
- Figure captions on separate sheet ☐
- Appendices (optional) ☐
- Line spacing 1.5 throughout MS ☐
- Pages numbered at top ☐
- Text flush left, ragged right ☐
- Font size 12 pt throughout MS ☐

Line drawings

- *All originals supplied ☐
- 3 complete copy-sets supplied ☐
- No. of hand-drawn line drawings ☐
- No. of computer drawings ☐
- *Diskette supplied matches paper copies ☐
- Scale on relevant illustrations ☐
- All illustrations with stated data source ☐

Photographs

- Complete original set supplied ☐
- 2 complete copy-sets supplied ☐
- No. of prints ☐
- No. of slides ☐
- Scale on all photographs or in captions ☐
- Geographic location on all field photos ☐

Tables

- Each with full title and numbered ☐
- Source(s) to data given under table ☐
- Tabs (not space bar) used for columns ☐

*Word processing diskette

- Supplied ☐
- Diskette(s) match print-out of manuscript ☐
- Name and version of programme: ☐

*Cover

- Front cover illustration (photograph or graphic design) ☐
- Back cover summary text (max. 120 words) ☐
- Spine text (max. 70 units) ☐

*Not applicable at submission unless requested; relevant after any revision (resubmission) Editorial office, July 1999

Danmarks og Grønlands Geologiske Undersøgelse (GEUS)
Geological Survey of Denmark and Greenland

Guidelines for ad hoc editors of the Survey's scientific publications

(or words of encouragement on a time-consuming job)

Ad hoc editors can be appointed for volumes in the *Geology of Denmark Survey Bulletin* and *Geology of Greenland Survey Bulletin* series. Ad hoc editing comprises both scientific editing and taking part in the technical editing. It has to be stressed that being editor is a time-consuming affair and this aspect should not be underestimated, neither should the job be mistaken with that of 'compiler' or 'organizer' of a report produced in limited numbers, e.g. GEUS Rapport.

Procedures and standards are described in *Rapport* **1998/53** and **1998/71**, but for good measure the main stages in the submission-refereeing-assessment-technical editing process are given below. *It is vital to note that all the work takes place in close cooperation with a scientific editor of the Publications committee who can act as joint editor.* It is the editor's responsibility to assure that all procedures and standards are followed, including the obvious rule that an ad hoc editor cannot be responsible for the peer review of a paper in which he or she has any authorship.

1) The editorial office (= e.o. = redaktionskontoret) plays a central role in the administration and production. All volumes are registered, budgeted, coordinated and set in production (DTP, both in-house and externally) through the office.

2) Manuscripts are submitted to the e.o. and *must be* accompanied by a completed *Authors' check list* and *Declaration form.*

3) It is important that all ongoing information about the progress/status of the volume is sent to the e.o. The information needed includes manuscript flow dates and referee information (full names and addresses of referees and dates of refereeing), resubmission dates, etc.

4) The colophon page is compiled by the e.o.

5) All manuscripts will be assessed by *at least* two referees, both of which are usually external. Manuscripts sent out to referees must be complete, and accompanied by a *Referee assessment and check list.* The fast editor is *always* involved in the choice of a referee.

6) Revised manuscripts *must* be accompanied by a clear statement giving the author(s') attitude to the comments of each referee and to those of the editors. All 'suggestions for improvements' that cannot be accepted by the author, either wholly or in part, *must* be clearly indicated in the statement. Manuscripts that do not contain this statement will not progress.

7) Each revised manuscript *must be* accompanied by a completed *Authors' check list.*

8) Manuscripts and illustrations for the complete volume, together with diskettes, etc. and all correspondence with all check lists to be delivered to the e.o. A condition that a volume is set in production is that this material is complete.

Editorial office (redaktionskontoret), February 1999

Danmarks og Grønlands Geologiske Undersøgelse (GEUS)
Geological Survey of Denmark and Greenland

Referee assessment and check list

For manuscripts submitted to GEUS' internationally reviewed scientific series, viz. *Geology of Denmark Survey Bulletin* and *Geology of Greenland Survey Bulletin*

Series: _____

Title: _____

_____

Author(s): _____

1) **Style and contents**
   a) Is the style of the paper suitable for international readership?
   b) Are all passages clear to the 'outside' or 'uninformed' reader?
   c) Do all parts of the manuscript warrant publication?
   d) Is there balance between the paper's length and topic?
   e) Does the paper show any signs of author self-righteousness or plagiarism?

2) **Title and abstract**
   a) Is the title of the paper appropriate? Can you suggest a better or shorter title?
   b) Is the abstract specific and representative of the paper?

3) **Main text**
   a) Is there a fair and balanced assessment of previous work?
   b) Does the information/data cited substantiate the conclusions?
   c) Can you point to omissions in relevant data or in data treatment?
   d) Should some sections be omitted, expanded or condensed?
   e) Is the pertinent literature cited? Is there unnecessary repetition?
   f) Is there a citation of superfluous literature?

4) **Illustrations**
   a) Are all illustrations necessary? Can you suggest improvements?
   c) Can you point to any illustration that has been published previously, either wholly, in part, or in modified form and that is not so acknowledged?
   d) Can you point to omissions in data source?

5) **Assessment** (please indicate one of the following). The manuscript:
   ☐ is acceptable with minor correction
   ☐ is acceptable with revision (includes reorganisation, rephrasing or restyling)
   ☐ is acceptable with major revision (includes a rethink, emphasis shift) and further refeering
   ☐ should be rejected

Can your name be made known to the author(s)?
Can your name be quoted on the publication as a reviewer?

Signature Date

Index