Title
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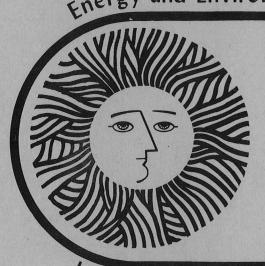
GEODOC -
The GRID Document File, Record Structure and Data Element Description

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GEODOC - The GRID Document File,
Record Structure and Data Element Description

T. G. Trippe, V. A. White, F. B. Henderson III, and S. L. Phillips

The purpose of this report is to describe the information structure of the GEODOC file, the document file of the National Geothermal Information Resource.

THE GEODOC FILE

GEODOC is a computer based file which contains the descriptive cataloging and indexing information for all documents processed by the National Geothermal Information Resource Group. This file (along with other GRID files) is managed by DBMS, the Berkeley Data Base Management System[1]. Input for the system is prepared using the IRATE Text Editing System[2,3] with its extended (12 bit) character set[4], or punched cards.

GEODOC RECORD STRUCTURE

Each record in the GEODOC file contains the descriptive cataloging, abstracting, and indexing information corresponding to a single document. The information within a given record is subdivided into "data elements". Table I lists the definitions of all the data elements which may appear in a GEODOC record. Some data elements (e.g., author's name) can occur repeatedly within one record. An "m" in the third column of Table I indicates that such multiple occurrences are allowed.

The "LBL tag" for each data element is shown in the left hand column of Table I. These tags are used to label the data elements within a record.

The data elements bear certain hierarchical relationships to each other; that is, some data elements are subordinate to, or, conversely, parents of, others. As will be seen, these relationships reflect certain natural relationships which exist between the various data elements. Figure 1 is a diagram of this hierarchical structure. The structure is also indicated in Table I by indenting the tag names of subordinate data elements and placing them after their parents.

The data elements may be input to the system in any order except that subordinate data elements must follow the occurrence of their parent with which they are associated. The use of this structure is made clearer in the examples given in the GEODOC INPUT section below.

INIS COMPATIBILITY

We have based our descriptive cataloging techniques on those of the International Nuclear Information System (INIS) of the International Atomic Energy Agency (IAEA). We have depended heavily on their excellent documentation, the IAEA-INIS series, which

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is referenced throughout this text.

In an effort to make this document stand alone, at least for those cases currently being handled by GRID, we have borrowed heavily from the INIS documentation, in some cases summarizing or even copying blocks of text. The presence of an INIS tag number after the titles in the Data Element Definitions section below indicates such a treatment.

The GEODOC data elements were selected to correspond as closely as possible with those used by INIS. This facilitates future information exchange with other data bases, (e.g., the ERDA Energy Data Base at Oak Ridge), and also permits us to use the existing INIS descriptive cataloging method[5].

An INIS tag is shown in Table I for those data elements whose internal format is identical or almost identical to the INIS format[5]. This is shown primarily for convenience in referencing INIS documentation.

GEODOC INPUT

The information for a GEODOC record is entered into the system by specifying the "data element value" (i.e., the contents) of each data element using DBMS[1] input statements of the form:

TAG.m = "data element value";

where TAG is an LBL tag (from Table I). The tag is followed by a period and an "occurrence number" (.m) which specifies that the mth value of TAG is being entered. If (.m) is omitted, (.1) is assumed; if the (.) is present but the (m) is omitted, then (m) is assumed to be the next available occurrence number. An equal sign precedes the data element value and a semi-colon must follow it. For example, a series of three authors names is written:

AU.1=Norikova, M.;
AU.2=Dorikens-Vanpraet, L.;
AU.3=Bobrowski, C.;

It is not neccessary to write these on separate lines because blanks and new lines following semi-colons are ignored. Also, as is described above, it is unnecessary to input the occurrence number explicitly. Thus the three author names could be input as:

AU=Norikova, M.; AU.=Dorikens-Vanpraet, L.; AU.=Bobrowski, C.;

This input can be further simplified by omitting the two appearances of "AU.=". This is because when the input processor encounters a semi-colon which is not followed by a valid LBL-tag, it assumes "TAG.=", where TAG is the last valid tag processed. Thus the three names can be input as:

AU=Norikova, M.; Dorikens-Vanpraet, L.; Bobrowski, C.;

This last input form is the simplest method for inputting multiple values of data elements. A more complete example is now given for the data elements under AUTHORS. The simplest way to input multiple authors, an author note, different affiliations and affiliation codes is as follows:

AU=Brown, N.D.; Berthaud, J.; Sidorov, Ya.V.; AN=eds.; AU.=Smith, A.B.;
AA=International Atomic Energy Agency, Vienna (Austria); AC=3294000;
AU=Mueller, F.; Swoboda, K.;
AA=Oesterreichische Studiengesellschaft fur Atomenergie G.m.b.H., Seibersdorf.
Forschungszentrum; AC=4853000;.

This is interpreted by the input processor to be:
    AUTHORS.1;
        AU.1=Brown, N.D.;
        AU.2=Berthaud, J.;
        AU.3=Sidorov, Ya.V;
           AN=eds.;
        AU.4=Smith, A. B.;
        AA=International Atomic Energy Agency, Vienna (Austria);
           AC=3294000;
    AUTHORS.2;
        AU.1=Mueller, F.;
        AU.2=Swoboda, K.;
        AA=Oesterreichische   Studiengesellschaft   fur   Atomenergie   G.m.b.H.
        Seibersodorf. Forschungszentrum;
           AC=4853000;.

This longer form could also be used to input the information.

Note that the data elements AUTHORS is not written in the simpler input form. The input processor inserts it because it must be present before any of its subordinate data elements can be input. Automatic insertion of the AUTHORS data element can be done because it is a "pure node" data element, i.e., a data element which contains no value. The purpose of pure node data elements is to link together groups of subordinate data elements. The first AUTHORS node in the above example links the authors Brown, Berthaud, Sidorov and Smith with their affiliation, the International Atomic Energy Agency. The second AUTHORS node links the authors Mueller and Swoboda with a different affiliation.

Some lower level data elements appear in the above example. The author note AN=eds.; is subordinate to AU.3 of AUTHORS.1. Each affiliation AA has a subordinate affiliation code AC, the seven digit INIS corporate code [6].

Note that the period following AU in AU.=Smith, A.B.; is necessary. It causes Smith to be input as the fourth occurrence of AU in AUTHORS.1. If AU without a period had been used, Smith would have been input as AU.1. Since an AU.1 (Brown) already existed in AUTHORS.1, a new AUTHORS node would erroneously have been created.

To summarize the conventions introduced above, let TAG be any data element tag.
    a)   TAG always means TAG.1
    b)   TAG. always means TAG.n where n is the next available occurrence number.
    c)   The absence of any valid tag following a semi-colon always means TAG.n where TAG is the last valid tag input, and n is as above.
    d)   Subordinate data elements must follow the parent to which they are linked and precede the next occurrence of their parent.

e)	Pure node parent data elements will be created automatically whenever required by the input of subordinate data elements.

DATA ELEMENT DEFINITIONS

The data elements and brief definitions are listed in Table I. This section gives a detailed description of each data element. We rely heavily upon the INIS descriptive cataloging rules[5], hereafter referred to as the INIS rules, for our descriptions.

Short Code (SC) one per record, mandatory.
This is a unique identifier for a document. It is composed of the first authors last name, a blank, a two digit year and, if necessary, a letter for uniqueness. E.g.,

SC=Valfells 75; or
SC=Smith 69E;

The sequence for the uniqueness letter is "blank", B, C, etc. A is not used. The last name should be identical with that given in Authors Name (AU). Use Anon. (e.g., SC=Anon. 75F) for any document which has no personal authors.

Record Type (TY) INIS-008 one per record, mandatory.
This is the INIS tag 008 information:

Type of Record/Bibliographic Levels/Literary Indicator

E.g., TY=R/AM/K; or TY=J/AS;. The following is a brief summary. See the INIS rules[5] for details. The allowed values for the components of TY are:
Type of Document — one of the following.
B — book
C — collection
D — drawing
F — film
G — map
H — phonorecord
J — journal article
P — patent
R — report
T — computer medium
Bibliographic Levels — a combination of the letters A, M, S and C defined as follows:
A — Analytic — only works not published separately but as part of
a larger bibliographic entity (cannot be used alone); e.g.,
chapter of a book, journal article, individual papers in conference
proceedings.
M — Monograph — publications which are non-serial because they are
complete at the time they are issued or are to be issued in
a known number of parts, e.g., reports, patents, pre-conference
papers, books or monographs.
S — Serial — publications issued in successive parts and intended
to be continued indefinitely (cannot be used alone), e.g.
periodicals, journals, proceedings, numbered monographic series.
C — Collective — various documents or other types of records gathered
together and cataloged as a single unit, e.g., samples of microfiche,
a folder bearing a title representative of its contents and

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containing various loose-leaf sheets.
Allowed combinations of A, M, S and C follow, along with examples of their uses.

M --- book, patent, pre-conference paper, report, encyclopedia, handbook
C --- collection of individually titled drawings
AM -- article in an encyclopedia, chapter of a book or report, conference paper in a bound set of proceedings
AS -- article in a journal
MC -- report or brochure or patent in a collection
MS -- book in a series
AMC - chapter of a report in a collection
AMS - chapter of a book in a series, conference paper from a proceedings book, which is part of a proceedings series.

Literary-Indicator   as many as are applicable.

K - conference (mandatory, see tag COT below)
L - dictionary, encyclopedia or glossary
N - numerical data
U - thesis (mandatory)
W - defines a standard or specification
Z - bibliography
Y - progress report (mandatory)
E - abstract or "short communication" (mandatory, see tag N below)

Descriptive Cataloging Node (DES-CAT)

DES-CAT is a pure node data element, i.e., it contains no value; all its information is carried in the data elements subordinate to it. This node contains all of the data elements required for one level of descriptive cataloging. It is essentially equivalent to one INIS worksheet. There must be one DES-CAT node for each bibliographic level (i.e., one for each letter in the "Bibliographic Levels" part of TY described above). The nodes must appear in the same order as the letters in TY, i.e., in order of increasing bibliographic level. E.g., for a paper published in a conference proceedings report, we would have

        TY=R/AM/K;
        DES-CAT.1;
            BL=A;

            .
            .   Other DES-CAT data elements at level A
            .

        DES-CAT.2;
            BL=M;

            .
            .   Other DES-CAT data elements at level M
            .

where BL is the "Bibliographic Level Indicator" described below. The data element name DES-CAT is not normally written in the input. It is inserted automatically when BL is input.

For each bibliographic level and type of record, Appendix I, the "Matrix of Bibliographic Data Elements," indicates which of the data elements are required (X), required if

present (P), optional (O) or forbidden (blank).

Data Elements of the DES-CAT Node:

Bibliographic Level Indicator (BL) INIS-008 Subordinate to DES-CAT.
There must be one BL per DES-CAT node. This can have one of the four possible values
A, M, S, or C as defined in the record type (TY) data element above.

Primary Title (PT) INIS-200 Subordinate to DES-CAT.
This is the title in English (translate if necessary). One is required on each level except S
(serial). Serial titles and subtitles are always entered as original title (OT) and original
subtitle (OS); they are not translated. Capitalize the first letter and proper nouns only.

If the document is a chapter in a book, enter the chapter title here on level A and the
book title on level M. If the chapter has both an actual title and something of the form
"Chapter 5", enter the actual title here and enter the "Chapter 5" as the primary
subtitle (PS) below. If no actual title exists enter the "Chapter 5" here as the primary
title (PT). The same principles apply to "Part 3", "Section 5", or any other such
subdivision. Capitalize the first letter, translate to English and convert the numerals to
Arabic if necessary, e.g., "second chapter" become "Chapter 2".

Primary Subtitle (PS) INIS-201 Subordinate to DES-CAT.
This is the subtitle in English (translate if necessary). It is used when two titles appear
on the title page. Usually one of these is the specific title, while the other is a
description such as Final Report, Technical Report, Progress Report for the Period of
..... etc. The description is always to be entered as the subtitle.

If the document is one volume of a monographic set, (i.e., non-serial set, e.g., a four
volume encyclopedia) then the subtitle frequently contains the volume number as well as
specific subtitle. In this case, the volume number must be included in the subtitle,
abbreviated "Vol." followed by a space, Arabic numerals and a period. E.g., [from
INIS-15 (Rev. 20)[14] pt. 3, p. 20]

<div align="center">

PHOSPHORUS and its COMPOUNDS
In Two Volumes
Volume II: TECHNOLOGY,
BIOLOGICAL FUNCTIONS, and APPLICATIONS"

</div>

becomes [see INIS-15(Rev. O)[14] pt. 2, p. 68]

<div align="center">

PT=Phosphorus and its compounds;
PS=Vol. 2. Technology, biological functions, and applications;

</div>

If, on the other hand, the volume has no specific subtitle, but only a volume number, then
for an analytic of this monographic set, the volume should be entered in the collation
(COL — discussed below) along with the page numbers. See, for example, INIS-2 (Rev.
2)[13] p. 44–45. However, for non-analytic entry covering this entire volume, the volume
number should be entered as the subtitle.

Title Augmentation (TA) INIS-620 Subordinate to DES-CAT.
In the preparation of a printed subject index, it may be desirable to print the title and
subtitle of each article under a given subject heading in order to give the user a more
specific indication of the document's contents. Some titles convey insufficient or

misleading information about the contents of the document. Furthermore certain types of documents such as institutional progress reports may have brief standardized titles which do not reflect the actual subject content of the report. In these cases, title augmentation may be used to provide the essential subject information which was omitted from the title. It may be in the form of descriptors, natural language text, single words, phrases, sentences, formulas, chemical reactions, etc. This information will be printed in the subject index in parentheses immediately following the title and subtitle and should therefore be supplementary to them without any duplication.

Language (L) INIS-600 Subordinate to DES-CAT.

If the document is entirely in English, omit this data element. If it is written in a language other than English, enter the preposition "In" followed by a space and the language (or languages, separated by commas). Examples:

> L=In Russian;
> L=In English, French, German;

Do not surround by parentheses as INIS does. Where multiple bibliographic levels are involved, enter the language at the lowest level only, e.g., A of AMS as shown in IAEA-INIS-2, p. 45[14].

Original Title (OT) INIS-230 Subordinate to DES-CAT.

For non-English documents, enter the title here in the original language. Transliterate if necessary using the INIS transliteration rules[7] and the diacritical sign and accent treatment given in Appendix I of the INIS descriptive cataloguing rules[5]. However, use the Greek alphabet, diacritical signs, and accents of our full character set instead of transliterating these.

Journal or Series Title (OT, level S) ISO Standards Subordinate to DES-CAT.

Journal and Series Title are input in abbreviated form according to ISO standards as documented in the Bibliographic Guide for Editors and Authors[8]. This has been chosen instead of the INIS Authority List for Journal Titles[9] because the former is more complete and because it contains CODEN.

Original Subtitle (OS) INIS-231 Subordinate to DES-CAT.

Always enter this in its original language, following the same rules as for the "Original Title"(OT).

Edition (ED) INIS-250 Subordinate to DES-CAT.

This is used when an edition statement appears on the document which is being encoded, exactly as INIS does. I.e.,

> "First edition" is never entered
> "Second edition" becomes "ED=2. ed.;"
> "third enlarged edition" becomes "ED=3. enlarged ed.;"

This data element is not allowed for reports. Such information is carried in parentheses after the report number (RN).

Journal CODEN (CODEN) Subordinate to DES-CAT.

This is the CODEN as documented in the Bibliographic Guide for Editors and Authors[8]. It is a five alphabetic character code with a sixth alphameric check character appended. Enter all six characters.

Authors Node (AUTHORS) Subordinate to DES-CAT.

This is a pure node data element. It serves to link together a group of authors with their affiliations. All authors (AU below) in a given authors node are associated with all affiliations (AA below) in the same node. An example is given in the "GEODOC INPUT" section above.

Data Elements of AUTHORS Node (within DES-CAT node):

Authors Name (AU) INIS-100 Subordinate to AUTHORS.

This entry is made up in the following sequence:
- a) Surname
- b) A comma and a blank followed by initials. Initials are followed by periods and are not separated by blanks. The full forename may be given if there is only one.
- c) A blank and other name fragments which are not forenames and which should be transposed to the end of the name according to the Anglo-American Cataloging Rules[10].

Transliterate as described in the original title (OT) section above. See the INIS rules[5] and the Anglo-American Cataloging Rules[10] for more details on name fragments and on Spanish matronymics (last example below). If the document has no personal author AU or corporate entry CE use Anon.

Examples:
Morris, A.C.
Koester, L.J. Jr.
Aizawa, Yoshio
Chen, Shin-Hsiung
Lopez-Garcia, A.
Da Fonseca, V.L.
La Fontaine, J. de
McCarthy, G.L.
Anon.
Lopez M del C, A.

Author Note (AN) INIS-100 Subordinate to AU.

This can have one of the following four values:
AN = ed.; for "editor"
AN = eds.; for "editors"
AN = comp.; for "compiler"
AN = comps.; for "compilers"

If authors, editors, and compilers are in the same author's node, transpose the authors to the end. Multiple editors (or compilers) should be grouped together and the note "eds." (or comps.) should follow the last author to which it applies.

Author Affiliation (AA) INIS-100 Subordinate to AUTHORS.

This is to be standardized according to the INIS Authority List for Corporate Entries and Report Number Prefixes, IAEA-INIS-6[6], if possible.

Affiliation Code (AC) INIS-700 Subordinate to AA.

This is the seven digit code from IAEA-INIS-6[6]. It should immediately follow the affiliation which it represents. It should not contain imbedded blanks. E.g., AC=9100234; . If the affiliation (AA) and its code (AC) are not found in IAEA-INIS-6, one of two procedures should be followed.

The first procedure is needed when you feel that the affiliation should be added to the GRID authority list. Format the name as is described in the preface of IAEA-INIS-6, according to COSATI standards[11]. In place of the affiliation code use "a" for add, i.e., AC=a; . This procedure should be used whenever you think the affiliation will appear more than once or twice.

The second procedure is to be used on affiliations which are unlikely to appear again, and for which you cannot justify the standardization effort. In this case, enter the affiliation in free form, and enter AC=x; which means "not standardized, do not add to the GRID authority list".

Corporate Entry (CE) INIS-110 Subordinate to DES-CAT.

All reports must have a corporate entry. This is standardized like author affiliation (AA) above. It is defined to be either

Corporate Author: the oganization(s) identified as responsible for the intellectual content of the document (in the absence of a personal author), or

Issuing Body/Assignee: the organizations identified as technically, editorially, or contractually responsible for its contents (in conjunction with a personal author), or the assignee(s) of a patent, or the academic institution granting a degree.

Corporate Code (CC) INIS-710 Subordinate to CE.

This is the seven digit code corresponding to the corporate entry (CE) above. If the corporate entry (CE) and its corporate code (CC) are not found in IAEA-INIS-6[6], the same procedures as were described for (AA) and (AC) should be followed.

Note on AA and CE: Frequently, the corporate entry(s) (CE) exactly duplicates the authors affiliation(s) (AA) for one of the AUTHORS nodes. In that case, the complete entry is made in CE, but is not made in AA. Instead, the symbolic notation, AA=CE; is used.

For example, in the example given in the GEODOC INPUT section above, suppose the author affiliation given in the first AUTHORS node were also the Corporate Entry. Then the input statements

        AA=International Atomic Energy Agency, Vienna (Austria);
        AC=3294000;
would be replaced by
        AA=CE;
        CE=International Atomic Energy Agency, Vienna (Austria)
        CC=3294000;

Academic Degree (DG) INIS-111 Subordinate to DES-CAT.

Consists of two parts:

        a)   Designation of the academic dissertation (Thesis, Thése, Habilitationsschrift,

etc.) entered according to the <u>Anglo-American Cataloging Rules</u>[10] and
followed by a space.
b) Academic degree abbreviated according to <u>Webster's New Collegiate
Dictionary</u>[12], placed in parentheses.

<u>Sponsor (SPO)</u> Subordinate to DES-CAT.
This is an organization designated as a sponsor of the document or of the work
described in it. This should be standardized and handled just as described above for
author affiliation (AA).

<u>Sponsor Code (SPC)</u> Subordinate to SPO.
This is the seven digit corporate code from IAEA-INIS-6[6].

<u>Sponsor's Contract Number (SCN)</u> Subordinate to SPO.
This is the contract number.

The sponsor code (SPC) and sponsors contract number (SCN) must follow the appropriate
sponsor (SPO), e.g.
SPO=USAEC, Washington, D. C.;
SPC=6549500;
SCN=W-7405-eng-26;

<u>Report or Patent Number (RN) INIS-300</u> Subordinate to DES-CAT.
Enter as in the INIS rules[5]:
a) Report number prefix separated from sequence number by double hyphen.
b) Semi-colons and spaces replaced by hyphens.
c) Transliterate letters if necessary.
The prefix letters must represent the responsible corporate body given in the corporate
entry (CE). If they do not, write them as given on the report, preceded by the acronym
or letter prefix identifying the largest organizational unit. E.g. "International Atomic
Energy Agency, Vienna (Austria) STI/PUB/129" should be entered as
RN=IAEA-STI/PUB--129;
Edition, revision, or part numbers should be placed in parentheses after the report
number, not in the edition tag (ED). E.g.
RN=TID--22361 (pt.1);
RN=IAEA-INIS--6 (rev.7);
RN=TID--11295(ed.4);
For purposes such as these the following abbreviations are to be used:

Addendum	add.
Amendment	amend.
Appendix	app.
Book	bk.
Chapter	ch.
Edition	ed.
Number	no.
Part	pt.
Revised, Revision	rev.
Section	sect.

Series	ser.
Summary	summ.
Supplement	suppl.
Volume	vol.

Many report numbers include descriptive words within the number; these words may either be ignored or abbreviated. The words are ignored when the numbers form one series regardless of the descriptive words; they are abbreviated when there are two or more series of numbers, each associated with a specific group of words. Abbreviations frequently used are:

Bulletin	Bull–
Circular	Circ–
Contribution	Contrib–
Memo.	M–
Memo. report	MR–
Publication	Pub–
Reference	Ref–
Report	omitted unless issuing organization has already abbreviated to "R–"; thus NRL Report 5414 becomes NRL--5414, but the "R" in ARD-R--2117 is retained
Research memo.	RM–
Research paper	RP–
Research report	RR–
Special report	SR–
Technical memo.	TM–
Technical note	TN–
Technical publication	TP–
Technical report	TR–
Technical translation	TT–
Translaton	Trans–

If the report is not numbered, enter RN=no number; and the system will assign a number of the form GRID--123. For patent number procedures, see the INIS rules[5] for tag 300.

Secondary Number (SN) INIS-310 Subordinate to DES-CAT.
Only one number is allowed as a report number (RN). Additional numbers, structured according to the same rules as for report numbers, are to be given here.

International Standard Book Number–ISBN (INT) INIS-320 Subordinate to DES-CAT.
If an ISBN is given it is to be entered as the letters "ISBN" followed by a blank and the ten character code. E.g.
        INT=ISBN 047156530X;

International Patent Classification Code–IPC (INT) INIS-320 Subordinate to DES-CAT.
For International (or National) Patent Codes, see the INIS rules[5] for tag 320.

International Standard Serial Number—ISSN (INT) INIS-320 Subordinate to DES-CAT.

When ISSN is introduced, it will be entered here as the letters "ISSN" followed by a blank and the code.

Publisher (PUB) INIS-402 Subordinate to DES-CAT.

The name of the publisher is entered here according to the <u>Anglo-American Cataloging Rules</u>[10], transliterated if necessary. Only one may be given. Choose any one if several are given.

Place of Publication (PUP) INIS-401 Subordinate to DES-CAT.

The place of publication is entered here as cited in the piece of literature according to the <u>Anglo-American Cataloging Rules</u>[10], transliteraled if necessary. If several places of publication are given, enter only the one which corresponds to the name given in (PUB).

Publication Date (PUD) INIS-403 Subordinate to DES-CAT.

The date of publication is given here as

     a)   The day of the month in arabic numerals.

     b)   The first three letters of the month (not followed by a period).

     c)   A four digit year.

Separate these by blanks. A range of months is entered as the first month; i.e., "January-February 1970" is entered as "Jan 1970". If only the season is given, omit it from the date, but equate Spring to no. 1, Summer to no. 2, etc., if no issue number is given, and enter this as the issue number in the collation (COL) described below. If no date exists, enter PUD=[nd];.

Collation (COL) INIS-500 Subordinate to DES-CAT.

The discussion given here (including the discussions of Chapter and Volume in the primary title and subtitle sections PT and PS above) goes beyond that given in the INIS rules[5]. The intent here is to remain entirely consistent with INIS, but to clarify the rules where the INIS documentation is unclear or inconsistent. Any actual deviations from INIS practice are unintentional. This data element gives volume and/or page number(s) or the number of pages or volumes for the piece of literature being recorded. Use English equivalents for non-English designations (e.g. v. for Band or Tome; suppl. for Ergänzungsband). Use the abbreviations

        v.   for volume(s)

        p.   for page(s)

        vp.   for various pages

        no.   for issue number(s)

        pt.   for part(s)

        suppl.   for supplement(s)

These abbreviations are to be separated from preceding and trailing numbers by a blank, except within parentheses, where abbreviations and their associated numbers are not separated.

Parentheses are placed around information other than volume and page (e.g. issue, part, or supplement) in journal references. Issue number is placed first, and is followed by a ccmma and a blank if other information follows inside the parentheses. If a volume

number and an issue number are both present, the abbreviation "no." is omitted. Parentheses are also used in some non-journal references, whenever page numbering is also present.

A range of numbers is indicated by a dash. Two (or more) ranges may be entered, separated by a comma and a blank.

Examples for most types of documents are shown in the following table, along with the INIS-2[13] page number for those cases which correspond to INIS samples. The collation is to be entered on the level indicated by "Entry Level"

Bib. Levels	Entry Level	Example of Collation	Page in Ref. 13	Comments
M	M	148 p.	15	book with 148 p.
AM	M	p. 277-285	41b	not p. 277-85
"	"	(suppl.) p. 665-668	39b	supplement to encyclopedia
AS	S	v. 5(5) p. 527-536	29	standard journal ref.
"	"	v. 1 p. 137-156		no issue no.
"	"	(no.3) p. 36-38		no volume no.
"	"	v. 7(2, pt.1) p.12-17		issue in several parts
"	"	v. 14(3-4) p. 245-248		issues 3 and 4 together
"	"	v. 10(suppl.) p. 83-91	33	
"	"	v. 2 p. 10-12, 20-28		continued on p. 20
"	"	v. 89(3) vp.		various pages
MC	M	20 p.	43a	
MS	M	80 p.	37	
AMS	M	v. 2 p. 193-207		proceedings in series
AMC	M	p. 16-17		

Page numbers should be converted to Arabic numerals, and, if possible, all ordinal numbers should be converted to cardinal numbers (e.g. "Second supplement" would be converted to "suppl. 2"). A book that shows pagination "x. + 132" would be entered as "142 p."

Chapter number is never entered here; it is always entered as part of the title or subtitle, as is discussed in the primary title (PT) section above.

Volume number is usually entered here. However, for monographic entries, not containing an analytic level, the volume number is included in the subtitle, as is discussed in the primary subtitle section above.

Note (N) INIS-610 Subordinate to DES-CAT.
The following entries are mandatory.

Type of Record	Mandatory Entry
D - drawings	Enter the scale as a decimal number,
G - maps	e. g.: "Scale 0.00035".

F – films	Enter the running time, indicate whether film has soundtrack or cclor, and show the nominal width. <u>Example</u>: "19 min. sd. color. 35mm" (note sd. = sound)
H – phonorecordings	Enter the running time, e. g. "28 min." If appropriate, indicate the rotation speed for disks and the width for phonotapes.
T – computer media	Enter sufficient data to indicate the requirements necessary to read it. For example, for a 9-track magnetic tape recorded at 800 binary digits per inch, your entry would read "9 track, 800 bits/in, NRZI".

When you are reporting a short communication one of the following notes must be entered here:

> N=Published in summary form only;
> N=Letter-to-the-editor;

Other mandatory INIS entries are not entered here because the GRID data elements already include them. These are "availability" in AV below and "translation information" in the related reference section (REL-REF) below.

The use of note (N) is not confined to the few obligatory instances just described. Any other significant information that has not been covered by the other data elements should be entered here in free form. For example if you are dealing with a review article which. ccntains an extensive bibliography, you should have included Z as a literary indicator in record type (TY) above. This can now be expressed quantitatively as a note, which might read simply:

> N=322 refs;

but might be put:

> N=Contains a bibliography of 322 refs. classified by subject;

Similarly you can indicate other interesting contents by notes of the form "3 drawings", "6 maps", etc. Such notes are not intended to be exhaustive but should be included at your discretion. There are many other possibilities. Use this data element wherever you believe that it would add to the GEODOC file.

Conference Title (COT) INIS-210 Subordinate to DES-CAT.

Whenever the piece of literature being encoded is related to a conference, encode "K" as the literary indicator in the document type (TY) data element discussed above, and enter the conference title, place and date in COT, COP and COD respectively. Enter the title here in its "official" and most complete form, i.e., as assigned by the organizers of the meeting. Translate into English if necessary.

If your piece of literature is one paper published within conference proceedings, the entries COT, COP and COD could apply equally to the A or M level. Enter it at A, according to the general rule that when two levels are equally appropriate you use the lowest level. <u>Note</u>: these entrys at the A level are supressed in the final output for conference proceedings (i.e. when TY=.../AM/K; or TY=.../AMS/K;). This avoids repetition of the information in the proceedings title. However, do not omit these entries on input.

Conference Place (COP) INIS-211 Subordinate to DES-CAT.

The entry here must show at least the city and country (e.g. Paris, France). Other geographic subdivisions larger than city but smaller than country may also be entered at your own discretion (e.g. Ann Arbor, Mich., USA). For spelling of city names, use the "Pronouncing Gazetteer" of Webster's New Collegate Dictionary[12]. Places not listed there are to be shown in the original language, transliterated if necessary. Country names should be standardized according to INIS: Terminology and Codes for Countries and International Organizations[15]. If a conference took place in more than one place, make multiple entries for this data element, e.g.:

    COP=Munich; Karlsruhe, F. R. Germany; Vienna, Austria; Trieste, Italy;

Conference Date (COD) INIS-213 Subordinate to DES-CAT.
Enter this in the same way as the publication date (PUD) described above. If a range of dates is given, enter only the beginning date.

Availability and Price (AV) INIS-213 Subordinate to DES-CAT.
Examples:
    AV=Available from University Microfilms, Inc., Ann Arbor, Mich.;
    AV=Free on application to the U. S. Geological Survey, Washington, D.C. 20244;
No policy decision with regard to NTIS or INIS availability has yet been made.

Related Reference Node (REL-REF) INIS-006-007-610 Subordinate to DES-CAT.
The use of this node is mandatory for translations and for non-English journals which are also published later in cover-to-cover translations. It can also be used for any relationship to other documents which you may wish to express. It is a generalization of INIS tags 006, 007 and 610. It contains data elements RL, RLR, RSC.

Relator (RL) INIS-006 Subordinate to REL-REF.
If your piece of literature is a translation, you must enter:
    RL=T;
For any other relationship, enter a slash:
    RL=/;

Relationship and/or Reference (RLR) Subordinate to REL-REF.
For a translation (RL=T;) relevant details of the original citation must be given, including the reference. Examples:
    RLR=Translated from Nippon Genshiryoku Gakkai-Shi, v. 13(4) p. 19-20 (Apr 1970);
    RLR=Translation of "Materia e Antimateria", Milano, Mondadori, 1961 Translated from Russian;
For other relationships (RL=/;) describe the relationship in free form, referring to the related document(s) by reference.

Note: When you report an article from a journal which is also published at a later date in the from of a cover-to-cover translation journal, you must enter the following:
    RL=/;
    RLR=for English translation see the journal.....;
(give the abbreviated English title of the journal as cited in the Bibliographic Guide for Editors and Authors[8].

Related Short Code (RSC) Subordinate to REL-REF.

The short code of the related reference is given here. If both types of relators (T and /) are used for the same document, put the translation first, e.g.

        REL-REF.1;
                RL=T;
                RLR=Geol. Geokhim. 23(6), 147(1972);
                RSC=Bumashnov 72;
        REL-REF.2;
                RL=/;
                RLR=This article gives results in disagreement with Geol. Zh. 17(9),
                42(1970);
                RSC=Ermolov 70;

The REL-REF nodes are not normally explicitly input, but are created when RL is input.

Abstract Node (ABSTRACT)

Each abstract node contains one abstract (ABS) and one or more abstract source (ABSO). There may be more than one abstract node.

Abstract (ABS) Subordinate to ABSTRACT.

Abstract in English, translated if necessary. Paragraph breaks are ignored.

Abstract Source (ABSO) Subordinate to ABSTRACT.

If the abstract is unchanged from the authors except for paragraphing, use

                ABSO=auth;

If the abstract has been altered (e.g. shortened) but has not been completely rewritten, enter two sources:

                ABSO=auth; IJK;

where IJK is the initials of the person who altered the abstract.

If the author abstract is left intact but augmented, put the abstract and the augmentation into two separate abstract nodes, e.g.,

        ABSTRACT.1;
                ABS=....text of abstract....;
                ABSO=auth;
        ABSTRACT.2;
                ABS=...text of augmentation...;
                ABSO=IJK;

This will appear in the printed output as follows:

                ...text of abstract...(auth)...text of augmentation...(IJK).

The augmentation should therefore be supplementary to the abstract and without any duplication.

Index Node (INDEX)

This node contains all indexing information. If the document is subdivided, the general analysis goes into INDEX.1 while the splits (subdivisions) go into INDEX.2, INDEX.3, etc. See the discussion of splits and the example below for more details. See also the INIS Manual for Indexing[17] for more discussion of this and other indexing topics.

Category/Qualifier (CQ) Subordinate to INDEX.

This is the GRID category/qualifier. If more than one category/qualifier is input, the category must be repeated with each qualifier, even if it is unchanged, e.g

CQ=Exploration/Geochemistry; Exploration/Geophysics;

Appendix II lists the allowed category/qualifiers.

TIC Category (TICC) Subordinate to INDEX.
This is the 6 digit ERDA Technical Information Center Category, entered without blanks. e.g.,

TICC=150301; 150302;

Enter at the most specific level applicable, i.e. do not enter the more general categories 150000 or 150300 in the above case because their presence is implied by the presence of one or more of their subcategories.

Descriptor (DE) INIS-800 Subordinate to INDEX.
This data element is for the descriptors which you have decided best describe your piece of literature. The descriptors must be selected from the Geothermal Thesaurus[16]. Enter only the descriptors from the most specific level applicable; presence of the broader terms is implied.

Data Descriptors (DD) Subordinate to INDEX.
Enter those thesaurus descriptors which describe the actual numerical or graphical data contained in this paper. Use the same rules as were given for DE above. Some or all of these data descriptors may duplicate the descriptors entered as DE. Other data descriptors (DD) may not appear as DE because the numerical data which they describe forms an insignificant part of the subject content of the article.

Identifier (ID) Subordinate to INDEX.
This is for free (uncontrolled vocabulary) descriptors. It is not to be used when you believe that the identifier should be in the thesaurus. It cannot be searched.

Proposed Descriptor (PD) INIS-810 Subordinate to INDEX.
If you encounter information which cannot be adequately described by the descriptors given in the latest version of the thesaurus, invent a descriptor and use it as an ordinary thesaurus descriptor in DE or DD. You must also enter the proposed descriptor here at PD. Once this record has been entered into the GEODOC file, you may use your proposed descriptor just like an ordinary descriptor, even before it is approved by the Thesaurus manager[16].

Discussion of INDEX Splits with Example:
Most documents should have only one index node (INDEX.1). For retrieval purposes, all descriptor and categroy information in INDEX.1 is considered to apply to the whole document.

Some documents can be more effectively indexed by subdividing the document into sections for indexing purposes. Each section can be indexed separately. The indexing information for each section should be placed in a separate INDEX node, beginning with INDEX.2. The INDEX.1 node is always reserved for indexing information which applies to the whole document. As an example, consider Uchiyama 70, Geothermics, Spec. Iss. 2, v. 2 (pt. 2) p. 1572-1580 (1970):

INDEX.1;
CQ=Utilization/Power Production;
TICC=150900;
DE=Matsukawa geothermal field; Japan; geothermal power plants; steam power plants;
INDEX.2;
CQ=Exploration/Geochemistry;
TICC=150904;
DE=steam;
DD=pressure; flow rate; temperature; gas content; hydrogen sulfide; carbon dioxide;
INDEX.3;
CQ=Physical Chemistry/Corrosion;
TICC=150903;
DE=steam; alloys; thermal water; Cr-Mo-V steel; stainless steel 41; SUS 50 alloy; NBsBl alloy; DCul-H alloy;
DD=corrosion;
INDEX.4;
CQ=Exploration/Geochemistry;
TICC=150302;
DE=thermal water; chemical analysis;
DD=pH; potassium; sodium; calcium; magnesium; iron; aluminum; silicic acid (H_2SiO_3); chloride; sulfate; carbonic acid (H_2CO_3); hydrogen sulfide; boric acid;
INDEX.5;
CQ=Reservoir Characterization/Piping;
TICC=150902;
DE=steam transmission; steam pipes; pipeline courses; diameter; thickness; thermal expansion; corrosion;
DD=steam pressure losses;

A search request for all documents containing data on "flow rate" at "Matsukawa geothermal field" would recover this document because INDEX.1 information applies to the whole document and therefore can be linked with the information from any section of the document; in this case INDEX.2. However, a search request for all documents containing information on the "chemical analysis" of "Cr-Mo-V steel" would not recover this document because INDEX.3 and INDEX.4 apply to separate sections of the document and cannot be linked.

Control Node (CONTROL)
The data elements contained in the control node are for GRID internal bookkeeping and control of GRID data files. They are not normally displayed to users. These data elements are as follows:

Local Availability (LA) Subordinate to CONTROL.
Location of local (LBL) hard copy, e.g., LA=GRID library;. The local availability (LA) indicates ownership. If you borrow the hard copy, leave LA unchanged but insert the following subordinate data element:

Borrow/Return (BR) Subordinate to LA.

For example: LA=K. Mirk; BR=Borrowed by JJH 7 Jan 75. Return by 1 Feb.;

Descriptive Cataloging Source (DCSO) Subordinate to CONTROL.
Descriptive Catalogers initials, a blank followed by a date in standard form and optional comment.

Abstracting and Indexing Source (AISO) Subordinate to CONTROL.
Abstractor-Indexer initials followed by a date and optional comment. If the abstracting or indexing are updated, add another AISO keeping the previous entry as well. Examples:
> AISO.1=FPH 7 Apr 1975;
> AISO.2=FPH 21 Sep 1975 augmented abstract;

Data-File (DATA-FILE) Subordinate to CONTROL.
This contains the file name of a GRID numerical data file. It is added to the GEODOC record to indicate that the numerical data file contains or should contain data from this document.

Data Descriptor for Potential Data (POT) Subordinate to DATA-FILE.

This contains data descriptors to describe the specific kinds of data from this document which should be in the named data file.

Data Descriptor for Included Data (IN) Subordinate to DATA-FILE.
This contains the data descriptor(s) for those data which are already included in the file named above. For example:
> DATA-FILE=well;
>> POT=steam sample data; isotopic data;
>> IN=isotopic data;

ACKNOWLEDGEMENTS

The development of this document file has involved the cooperative efforts of many people and groups.

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We also wish to acknowledge useful discussions with S. Schwartz and J. Stokes (LBL), N. Crow and D. Elchesen (Technical Information Department, LLL).

References

1) David R. Richards (LBL), <u>Berkeley DBMS</u>, Particle Data Group Internal Memo PDG-2000 (DRR 11 NOV 1975 or later version).

2) M. Leavitt and C. M. Lederer, <u>Overview of IRATE-Interactive Retrieval and Text Editor</u>, LBL-4607, September 1975.

3) A. Allen and B. Armstrong, (LBL), <u>How to Get Along with an IRATE Terminal</u>, October 1974.

4) The IRATE character set contains numbers, upper case and lower case Roman letters with font control to change from normal characters to italics, boldface bold italics, or Greek characters. In addition many special characters are available, including overwriting characters such as umlauts (ä), underlined (a) and vector arrows (ä).

5) International Atomic Energy Agency, Vienna (Austria), <u>INIS: DESCRIPTIVE CATALOGUING RULES</u>, IAEA-INIS-1 (Rev.2), June 1972.

6) International Atomic Energy Agency, Vienna (Austria), <u>INIS: AUTHORITY LIST FOR CORPORATE ENTRIES AND REPORT NUMBER PREFIXES</u>, IAEA-INIS-6 (Rev.7), May 1974.

7) International Atomic Energy Agency, Vienna (Austria), <u>INIS: TRANSLITERATION RULES FOR SELECTED NON-ROMAN CHARACTERS</u>, IAEA-INIS-10 (Rev.1), March 1971.

8) Biosciences Information Service of Biological Abstracts, Chemical Abstracts Service, and Engineering Index, Inc., <u>BIBLIOGRAPHIC GUIDE FOR EDITORS AND AUTHORS</u>, American Chemical Society, Washington, D. C., 1974.

9) International Atomic Energy Agency, Vienna (Austria), <u>INIS: AUTHORITY LIST FOR JOURNAL TITLES</u>, IAEA-INIS-11 (Rev.3), June 1974.

10) American Library Association, <u>ANGLO-AMERICAN CATALOGING RULES</u>. Prepared by the American Library Association, The Library of Congress, the Library Association and the Canadian Library Association. North American text. Chicago, 1967. 400 p.

11) U.S. Committee on Scientific and Technical Information (COSATI), <u>STANDARD FOR DESCRIPTIVE CATALOGING OF GOVERNMENT SCIENTIFIC AND TECHNICAL REPORTS</u>, PB-173314.

12) <u>WEBSTER'S NEW COLLEGIATE DICTIONARY</u>, Latest ed. Springfield, Mass. Merriam.

13) International Atomic Energy Agency, Vienna (Austria), <u>INIS: DESCRIPTIVE CATALOGUING SAMPLES</u>, IAEA-INIS-2 (Rev.2), June 1972.

14) International Atomic Energy Agency, Vienna (Austria), <u>INIS: SELF-TEACHING MANUAL FOR DESCRIPTIVE CATALOGUERS</u>, IAEA-INIS-15 (Rev.0), September 1972.

15) International Atomic Energy Agency, Vienna (Austria), INIS: TERMINOLOGY AND CODES FOR COUNTRIES AND INTERNATIONAL ORGANIZATIONS, IAEA-INIS-5 (Rev.2), July 1971.

16) The Geothermal Thesaurus is being prepared by Jessie Herr (Information Research Group, LBL) in cooperation with GRID-LBL, and ERDA-TIC.

17) International Atomic Energy Agency, Vienna (Austria), INIS: MANUAL FOR INDEXING, IAEA-INIS-12 (Rev.2), January 1974.

Table I. GEODOC Data Elements

LBL Tag	INIS Tag	m*	n*	Data Element Definition
SC	008			document short code: unique identifier for document
TY				type of document/bibliographic levels/literary indicator
DES-CAT		m	n	delineates information for one bibliographic level
BL	009			bibliographic level indicator
PT	200			primary title (translated into English if necessary)
PS	201			primary subtitle (translated into English if necessary)
TA	620			title augmentation
L	600			language (for non-English document)
OT	230			original title (non-English) or journal/series title
OS	231			original subtitle (non-English) or journal/series subtitle
ED	250			edition
CODEN				journal CODEN
AUTHORS		m	n	delineates author-affiliation group
AU	100	m		author's name
AN	100			author note (ed., comp., eds., comps.)
AA	100	m		author's affiliation
AC	700			affiliation code
CE	110	m		corporate entry
CC	710			corporate code
DG	111			academic degree
SPO		m		sponsor
SPC				sponsor code
SCN		m		sponsor contract number
RN	300			report or patent number
SN	310	m		secondary numbers
INT	320			International Standard Book Number or Patent Code
PUB	402			publisher
PUP	401			place of publication
PUD	403			publication date
COL	500			collation (volume, issue, page)
N	610			note
COT	210			conference title
COP	211			conference place
COD	213			conference date
AV				availability and price

Table I. GEODOC Data Elements (Continued)

LBL Tag	INIS Tag	m*	n	Data Element Definition
REL-REF		m	n	delineates information for one related reference.
RL				relator
RLR				relationship and reference
RSC				related short code
ABSTRACT		m	n	delineates one abstract
ABS		m		abstract
ABSO		m		abstract source
INDEX		m	n	INDEX.1 general indexing. INDEX.2, 3,...N splits
CQ		m		category/qualifier
TICC		m		TIC category
DE	800	m		descriptor from thesaurus
DD	800	m		data descriptor from thesaurus
ID	m			identifier
PD	810	m		proposed descriptor
CONTROL			n	internal LBL data elements
LA		m		local availability
BR				borrow/return
DCSO		m		descriptive catalogers initials, date and comment
AISO		m		abstractor-indexers initials, date and comment
DATA-FILE		m		data file name
POT		m		data descriptor for potential data
IN		m		data descriptor for included data

*m—This data element may have multiple entries

*n—This data element contains no value and need not be entered on input. It serves to delineate a group of data elements.

Fig. 1 GEODOC Record Structure

SC TY

REL-REF;   ABSTRACT;   INDEX;   CONTROL;

RL RLR RSC   ABS ABSO   CQ TICC DE DD ID PD   LA DCSO AISO DATA-FILE

BR   POT   IN

DES-CAT;

BL PT PS TA L OT OS ED CODEN   CE DG RN SN INT PUB PUP PUD COL N COT COP COD AV

CC

AUTHORS;   SPO

AU   AA   SPC   SCN

AN   AC

APPENDIX I. MATRIX OF BIBLIOGRAPHIC DATA ELEMENTS

←————————————Lower————————————Higher————————→

Bibliographic Data Elements	TAG	Journal Articles (J), Books Chapters, Etc. (ANALYTICAL-A)	Books or Monographs	Drawings or Photographs	Films	Maps and Atlases	Phonorecords	Patents	Reports	Computer Media	Journals and Series (SERIAL-S)	Collection (COLLECTIVE-C)	Abst. & Index Level
Primary Title	PT	X	X	X	X	X	X	X	X	X		X	
Primary Subtile	PS	P	P	P	P	P	P	P	P	P		P	
Title Augmentation	TA	O	O	O	O	O	O	O	O	O		O	
Language	L	P	P	P	P	P	P	P	P	P		P	
Original/Journal Title	OT	P	P	P	P	P	P	P	P	P	X	P	
Original/Journal Subtitle	OS	P	P	P	P	P	P	P	P	P	P	P	
Edition[1]	ED		P			P			P		P	P	
CODEN[2]	CODEN										X		
Author(Au Note)[3]	AU	P	P		P	P	P	X	P	P		P	
Affiliation (Code)[4]	AA	P	P		P	P	P	P	P	P		P	
Corporate Entry (Code)[3,4]	CE	P	P	X	P	P	P	P	X	P		P	
Sponsor (Code) Control No.[4]	SPO	P	P	P	P	P	P	P	P	P		P	
Report/Patent No.	RN			P		P		X	X	P			
Secondary Numbers	SN	P	P	P	P	P	P	P	P	P		P	
ISBN/IPC	INT		P			P		P	P	P			
Publisher	PUB		X			P	P	P				P	
Place of Publication	PUP		X			P	P	P				P	
Publication Date[2]	PUD		X	X	X	X	X	X	X	X		P	
Collation[5]	COL		X	X		P		X	X	P	X	P	
Notes	N	O	O	X	X	X	X	O	O	X	X	O	
Conference Title[6]	COT	P	P		P		P		P			P	
Conference Place[6]	COP	P	P		P		P		P			P	
Conference Date[6]	COD	P	P		P		P		P			P	
Availability	AV		P	P	P	P	P	P	P	P	P	P	
Relator[7]	RL	P	P	O	O	O	O	O	P	O	O	O	
Relationship, Reference[7]	RLR	P	P	O	O	O	O	O	P	O	O	O	
Related Short Code	RSC	P	P	O	O	O	O	O	P	O	O	O	
Abstract	ABS												X
Abstract Source	ABSO												X
Category/Qualifier	CQ												X
TIC Category	TICC												X
Descriptor (MQ)	DE												X
Proposed Descriptor	PD												P
Identifier	ID												O

FOOTNOTES TO MATRIX OF BIBLIOGRAPHIC DATA ELEMENTS:

X   Indicates that the corresponding data element must always be entered for the associated type of record.

P   Indicates that the corresponding data element must be entered if present on the document being cataloged.

0   Indicates that the corresponding data element is optional and to be used at the discretion of the encoder

☐   Absence of a symbol indicates that the corresponding data element is never entered for the associated type of record.

1   For reports the edition is entered as part of the report number.
2   For series the CODEN and publication date are omitted.
3   Either author or corporate entry must be given.
4   The code in brackets must be present whenever these data elements are used.
5   For series the number of the series, if given is entered here.
6   For documents related to a conference these data elements are required.
7   For translations and for non-english journals which are published later in cover-to-cover translations these data elements must be present.

WHEN IDENTICAL ENTRIES WOULD OCCUR IN MULTI-LEVEL RECORDS ENTER ONLY AT THE MOST APPROPRIATE LEVEL.
IN CASES WHERE IDENTICAL ENTRIES AT TWO LEVELS ARE EQUALLY APPROPRAITE, ENTER ONLY AT THE LOWEST LEVEL.

GEODOC Category/Qualifier Authority List

Category	Qualifier
Exploration	Geology
	Geochemistry
	Geophysics
	Hydrology
	Evaluation
	Land-Use Factors
Physical Chemistry	Solutions
	Gases
	Minerals
	Silica
	Working Fluids
	Heat Transport Materials
	Corrosion
	Scaling
	Rock-Solution Interactions
Environmental	Subsidence
	Seismicity
	Noise
	Water Mixing
	Land-Use Factors
	H_2S
	NH_3
	Metals
Utilization	Hot Water Transport
	Space Heating
	Process Heat
	Agricultural Heat
	Power Production
	Corrosion
	Scaling
	Evaluation
	Binary Cycle Power
Institutional	Land-Use Factors
	Exploration and Production
	Operating Regulations
	Financial Incentives
	Power Sales
	Fluid Transport
	Legislation
Reservoir Characterization	Porosity
	Artificial Stimulation
	Natural Recharge
	Artificial Recharge
	Modeling
	Well Tests and Measurements
	Piping