NSSDC/WDC-A-R&S 91-32

# DIRECTORY INTERCHANGE FORMAT MANUAL

Version 4.0
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# Contents





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# Preface

The Directory Interchange Format (DIF) is a data structure used to exchange directory-level information about data sets among information systems. In general, the format consists of a number of fields that describe the attributes of a directory entry and text blocks that contain a descriptive summary of and references for the directory entry. All fields and the summary are preceded by labels identifying their contents. All values are ASCII character strings. The structure is intended to be flexible, allowing for future changes in the contents of directory entries.

The manual is structured as follows: Section I is a general description of what constitutes a directory entry; section II describes the content of the individual fields within the data structure, together with some examples. Next are six appendices.

Appendix A describes the syntax used within the examples.

Appendix B shows samples of the directory interchange format applied to different data sets.

Appendix C gives allowable discipline keywords.

Appendix D provides a current list of valid location keywords.

Appendix E lists allowable parameter keywords.

Appendix F provides a list of acronyms and a glossary of terms used.

Appendix G describes the Standard Formatted Data Unit header, which may be added to the front of a DIF file to identify the file as a registered standard format.

**NOTE!** It is not necessary to read the entire manual to understand the basics of the format or to get started creating DIF files. For a quick review, you should go through section I. The rest of the manual should be considered as reference material to answer specific questions on individual field syntax, valid field values, keywords, etc. The only fields required within each DIF file are the following:

Directory Entry Identifier
Directory Entry Title
Parameter Keyword
Data Center
Summary

Of each of these required fields, the Summary is the most important and the most flexible. You can freely describe the data and include any necessary qualifying details in the Summary.

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If you need more information or assistance,
contact the Master Directory User Support Office:

Master Directory
7601 Ora Glen Drive, Suite 300
Greenbelt, Maryland 20770
(301) 513-1687
NSI/DECnet-NCF::MDUSO
Internet-MDUSO@NSSDCA.GFSC.NASA.GOV

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# I. Directory Entry: Definition and Example

## 1.1 Directory Entry Overview

A directory entry consists of a collection of "metadata" fields describing a group of data. The individual fields are described in detail in section II of this manual. They include the list of items below. A directory entry always begins with the Entry ID as its first field. Although the remaining fields may be specified in any order, it is recommended that the fields be supplied in the order given in this manual.

A key question when preparing data descriptions in Directory Interchange Format is what "group" of data should be described in a single entry. In some cases, a group of data commonly regarded as a "data set" will be described by a single directory entry. In other cases, you may choose to group related data together even though they may be readily identifiable in smaller subsets at the catalog or inventory level. As the technical, archive, or data system contact who is preparing the directory information, your determination of the appropriate group of data to describe at the directory level should be the primary guideline. In writing directory level data descriptions, you should consider both the scientific users of the directory as well as the structure of the data systems supporting the data. The following guidelines are offered as suggestions that may be used in writing directory data descriptions.

At a directory level, it is recommended that data be grouped to

- minimize the number of similar entries a user needs to read, and
- bring together data sets which have only minor differences.

Data set characteristics that might suggest separate directory entries are

- a unique sensor/platform/project combination.
- a unique parameter, parameter combination, or set of independent variables contained in the data set.
- a unique processing level.

Data set characteristics that generally do not indicate a need for separate entries include

- identical data sets available on different media.
- data held at multiple locations, except when significant differences exist between the data archived in different places (e.g., different processing algorithms).
- distinct spatial or temporal resolutions or coverages for a given group of data.

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- data used for the interpretation or organization of a data set (e.g., map overlays, indices to data), which would not be listed separately but which would be mentioned in the summary.

A few examples of how data sets might be grouped into single directory level entries are as follows:

- A set of 1-second, 15-second, and 1-minute averages of magnetic field data that describe the same parameters but at differing temporal resolutions would be described in a single entry with the differing resolutions being discussed in the summary.
- Data that contain the same parameter information (derived from the same source and/or processing methods) for large, non-adjacent areas such as north polar and south polar areas, would be described as a single entry (in this case, the DIF file would list the largest single continuous area that contained the actual areas of coverage, with the specific areas covered mentioned in the summary).
- A series of data sets containing similar physical parameters derived from a common instrument on a satellite series, such as the AVHRR data from the NOAA series satellites, would be entered as a single directory entry with multiple sources (spacecraft) entered.

The fields that may be used in creating a directory entry are as follows:

Directory Entry Identifier
Directory Entry Title
Start and Stop Dates
Sensor Name
Source Name
Investigator
Technical Contact
Author
Data Center (Name, Contact Person, and Dataset ID)
Originating Center
Campaign or Project Name
Storage Medium
Parameter Measured
Discipline Keywords
Location Keywords
General Keywords
Coverage
Revision Date
Science Review Date
Future Review Date
Reference
Quality
Summary

In order for the directory entry to be useful to directory users, it is strongly recommended that all applicable fields for a given data set be entered. Some information may not be available or cannot be recovered for an older data set, and some fields do not necessarily apply to every space and Earth science data set. These fields include campaign/project, coverage, sensor, and source (e.g., data sets composed of recorded human observations, such as mineral locations, may not have a sensor or meaningful source). Other fields are critical for use in data set selection (e.g., parameter, time coverage, discipline) or user understanding of the data (e.g., summary, reference, data set personnel). In cases where the field information cannot be obtained or would not make sense, the entire field should be omitted. The minimum set of required fields that must be provided with DIF data descriptions are as follows:

Directory Entry Identifier
Directory Entry Title
Parameter Keyword
Data Center
Summary

The definitions and examples of these fields are given in the next section, but an example of how they are used to create a Directory Interchange Format (DIF) file is shown below.

In several fields the DIF provides for both long names and short names for the field. In such cases the short name is listed first followed by the ">" character and then the long name.

## EXAMPLE

The following example is for a relatively standard type of directory entry representing a data set. Other examples may be found in Appendix B. Definitions of the individual fields are found in the next section. The full list of fields together with the syntax used is defined in Appendix A.

```
Entry_ID:      RB2/EN67-5
Entry_title:   "Gridded, Averaged Earth Radiation Parameters from NIMBUS-7
                ERB (ERB-EMST)"
Start_date:     1978-11-16
Stop_date:      1985-10-31
Sensor_name:    ERB>Earth Radiation Budget Instrument
Source_name:     Nimbus-7
Group: Investigator
   First_name: H.
   Middle_name: Lee
   Last_name:  Kyle
   Phone:      301-286-9415
   Group: address
        Code 636
        Goddard Space Flight Center
        Greenbelt, MD 20771
   End_Group
End_Group
Group: Technical_Contact
   First_name: H.
   Last_name:  Jacobowitz
   Phone:      301-763-4290
   Group: Address
        Atmospheric Sciences Branch
```

```
          NOAA/NESDIS
          5001 Silver Hill Road
          Suitland, MD  20233
    End_Group
 End_Group
 Group: Author
    First_name: Hyo-Duck
    Last_name:  Chang
    Phone:      301-794-5000
    Email:      SPAN> NCF::HCHANG
 End_Group
 Group: Data_Center
   Data_center_name:    NCDS>NASA Climate Data System
   Dataset_ID:     RB2/EN67
   Group: Data_center_contact
       Last_name:  Reph
       First_name: Mary
       Phone:      301-286-5037
       Group: Address
          NASA/GSFC
          NCDS - Code 634
          Greenbelt, MD  20771
       End_Group
    End_Group
 End_Group
 Group: Data_Center
   Data_center_name:     NSSDC>National Space Science Data Center, NASA
   Dataset_ID:           78-098A-07O
 End_Group
 Originating_Center:  NCDS
 Storage_medium:     1 Tape, 100 MBytes
 Parameter:   Earth Radiative Properties> Albedo
*Parameter:   "Earth Radiative Properties>Irradiance>Outgoing
 Longwave Radiation"
 Parameter:   Earth Radiative Properties>Irradiance> Net Radiation
 Parameter:   Earth Radiative Properties>Solar Activity> Solar Insolation
 Discipline:  Earth Science>Atmosphere
 Discipline:  Earth Science>Land
 Group:  Coverage
  Minimum_latitude:      -90
  Maximum_latitude:       90
  Minimum_longitude:    -180
  Maximum_longitude:     180
 End_Group
 Location:    Global
 Keyword:     World Grid
 Keyword:     Earth Radiation Budget
 Keyword:     Climatology
 Revision_Date:       1988-07-05
 Science_Review_Date: 1988-07-07
 Group: Reference

 The Nimbus-7 user's guide, NASA/GSFC, Greenbelt, Maryland, 1978.
```

---

* Quotation marks are used to denote entries with a length of more than one line.

Hartmann, D. L., V. Ramanathan, A. Berroir, and G. E. Hunt, Earth radiation budget data and climate research, Rev. Geophys. Space Phys., 24, 439-468, 1986.

Jacobowitz, H., and R. J. Tighe, The Earth radiation budget derived from the Nimbus-7 ERB experiment, J. Geophys. Res., 89, 4997-5014, 1984.

Kyle, H. L., P. E. Ardanuy, and E. J. Hurley, The status of the Nimbus-7 ERB E9
arth radiation budget data set, Bull. Amer. Meteor. Soc., 66, 1378-1388, 1985.

End_Group

Group: Summary

The ERB (Earth Radiation Budget) MATRIX Summary Tape (EMST) is a single 6250 bpi tape which contains monthly averaged world grid (WG) data extracted from the Nimbus-7 ERB MATRIX tapes (also available through NSSDC and NCDS). Only monthly averaged WG data are included in the EMST. The WG data for each ERB parameter consists of 2070 ERB target areas, each target area having an equal area of 500 km x 500 km.

The ERB parameters on the EMST include outgoing longwave radiation, albedo, net radiation and their statistics calculated from the fixed Wide Field of View (WFOV) sensors and the Narrow Field of View (NFOV) scanner. Both daytime (ascending node) and nighttime (descending node) data are available. The scanner failed on June 22, 1980 and the NFOV data are available only for the period November 1978 - June 1980.

The EMST covers the period November 1978 - October 1986. Each data file contains one month worth of WG data. Other related data sets include: the NOAA heat budget data from AVHRR (HB/NOAA), CMATRIX from the Nimbus-7 THIR (CL/TN7), and ERBE-S9 and -S10 from ERBS and NOAA-9 and -10.

End_Group

# II. Individual Field Specifications: Field Definitions and Examples

## 2.1 Directory Entry Identifier

This field is the unique identifier used by the data system or data producer to distinguish this entry (or data set) from all others. It should be the same as the Data Set Identifier (see Data Center, section 2.7), but in cases where the data set is broken into several directory entries the data set identifier should be modified, usually by the addition of a numeric suffix, to be unique. When a directory entry represents more than one data set, a more generic identifier should be created. In cases where there is no unique data set identifier, a short mnemonic giving some indication of content is recommended.

The Directory Entry Identifier **must** be the first field in the DIF file.

This field may appear only once. The field is required as part of the DIF file.

EXAMPLES

```
Entry_ID: BPSSAL5A

Entry_ID: THEP87-1
```

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## 2.2 Directory Entry Title

This field contains a concise title of the directory entry sufficiently descriptive to allow a reader to make a reasonable decision as to whether the data may be of interest. The following guidelines are suggested for directory entry titles.

- Titles should be similar to journal article titles in that they must convey the entry's content to the reader.
- The instrument, mission, and/or investigator should be included when these are important identifying characteristics of the data.
- The parameters or variables measured by the data and processing level should be included when these are important identifying characteristics of the data.
- Acronyms that are not common knowledge across science disciplines should be kept to a minimum or spelled out.
- Titles should be limited to 160 characters or no more than two lines. (Quotation marks are used to denote entries with a length of more than one line.)

This field may appear only once. This field is a required part of the DIF file.

EXAMPLES

```
Entry_Title:  "Dynamics Explorer-1 Energetic Ion Composition Spectrometer
              Stand-alone Telemetry Files"

Entry_Title:  SEASAT SMMR Sea Surface Temperature, Atm. Water & Vapor content,
              Wind Speed and Rain Rate Level 2.5"

Entry_Title:  "International Satellite Cloud Climatology Program & (ISCCP)
              Cloud Cover Radiance Data From GOES-5 VAS"

Entry_Title:  "Middle Atmosphere Electrodynamics Electron Precipitations From
              The Aurorozone-I X-RAY Detector"
```

## 2.3 Directory Entry Start and Stop Date

These fields contain the first and last dates of the data associated with the directory entry. Times of day may be attached if they are necessary for the directory user. If the data continue through the present, then the stop date should be omitted.

Dates and times shall be specified in a form compatible with ISO 8601, as follows:

- yyyy-mm-dd for date only without time
- yyyy-mm-ddThh:mm:ss for date with unqualified (local) time
- yyyy-mm-ddThh:mm:ssZ for date with UTC time

Years shall be full four-digit years. Month and day of month shall be two digits, with leading zeroes if necessary.

For directory entries, start and stop dates are normally specified without the time of day. If times are included, it is strongly recommended that they be in UTC (tagged with the "Z" suffix).

These fields may appear only once.

<u>EXAMPLES</u>

```
Start_date:  1986-06-31

Start_date:  1986-06-31T12:00:31Z

Stop_date:   1986-06-31T16:00:00
```

## 2.4 Sensor Name

The sensor is the instrument or hardware used to acquire the data. Both a long name and a short name should be provided. These are placed on the same line separated by the ">" character, with the short name first. The long name is the full name normally used to describe the sensor. The short name is usually a mnemonic or otherwise abbreviated version of the long name. If no obvious short name exists, contact the terminology control point for your discipline or the NSSDC to obtain one.

This field may be repeated as many times as necessary.

EXAMPLES

```
Sensor_Name:  ALT>Altimeter

Sensor_Name:  AVHRR>Advanced Very High Resolution Radiometer

Sensor_Name:  SMMR>Scanning Multichannel Microwave Radiometer

Sensor_Name:  XBT>Expendable Bathythermographs

Sensor_Name:  VISSR>Visual and Infrared Spin Scan Radiometer

Sensor_Name:  SSM/I>Special Sensor Microwave/Imager
```

## 2.5 Source Name

The data source refers to the spacecraft, instrument, platform, ship, ground station, or telescope, etc., that contains the sensors. Both a long name and a short name should be provided. These are placed on the same line separated by the ">" character, with the short name first. The long name is the full name normally used to describe the source. The short name is usually a mnemonic or abbreviated version of the long name. If no obvious short name exists, contact the terminology control point for your discipline or the NSSDC to obtain one.

This field may be repeated as many times as necessary.

EXAMPLES

```
Source_Name:  DE-2>Dynamics Explorer 2
Source_Name:  DE-1>Dynamics Explorer 1
Source_Name:  MMT>Multiple Mirror Telescope
Source_Name:  KAO>Kuyper Airborne Observatory
Source_Name:  VGR1>Voyager-1
Source_Name:  POWB>Pacific Ocean Weather Buoys
```

## 2.6 Investigator, Technical Contact, and Author

The investigator is the person who headed the investigation or experiment that resulted in the acquisition of the data described (e.g., Principal Investigator, Experiment Team Leader). The investigator is listed so that a scientist or other user may contact the individual (or the technical contact described below) for high level data interpretation, algorithm information, and data quality questions. This information may also be useful in determining agency or departmental funding or technical responsibility for the data.

In situations where data were produced through an interagency effort or with co-principal investigators, more than one investigator may be listed. In situations where a new investigator has assumed the duties of leading the acquisition or processing of data, only the currently active investigator should be listed in an investigator group.

If many investigators are listed, the usefulness of this field will be diminished, in that there is no indication of which investigator is responsible for any subset of the data. Therefore, if a single DIF file represents a large aggregation of data produced through the cooperation of several investigator teams, it is recommended either to identify the principal investigator (PI) and list that person in the DIF file or to indicate no investigators and use the summary or reference text blocks to point to the location of a comprehensive list of investigators and their relationships to the data.

The technical contact is a person who is knowledgeable about the technical content of the data (quality, processing methods, units, available software for further processing, etc.). This may be the investigator or it could be a co-investigator or other knowledgeable person. Preferably, there should be listed one technical contact only. In exceptional cases, i.e., where the same data set is available at geographically remote locations like one in Europe, one in the USA, one in the USSR, more listings of technical contacts are allowed with the understanding that from the locations of the technical contacts it is clear to the user which contact is the most appropriate.

The author is the person responsible for the accuracy of the information content of the directory entry.

Additional information (address, phone, etc.) useful for contacting the person is included along with the name. Since the file may be used for other data bases in the future, it is better to provide this information whenever possible. The syntax for this information is shown in Appendix A.

Investigator may be repeated as many times as necessary. The author may appear only once.

EXAMPLES

```
Group: Investigator
  Last_name:  Parke
  First_name: Michael
  Middle_name:E.
  Email:      Telemail>[M.PARKE/OMNET]MAIL
  Group:  Address
      MS 300-323
      Jet Propulsion Laboratory
      4800 Oak Grove Drive
      Pasadena, CA 91109
      USA
  End_Group
End_Group
```

```
Group: Technical_contact
  Last_name:   Hilland
  First_name:  Jeffrey
  Middle_name: E.
  Email:       SPAN>STANS::JEH
  Email:       Telemail>[JHILLAND/NASA]NASAMAIL
  Phone:       1-818-354-4787
  Phone:       792-4787 (FTS)
  Group: Address
      MS 300-319
      Jet Propulsion Laboratory
      4800 Oak Grove Drive
      Pasadena, CA 91109
      USA
  End_Group
End_Group

Group: Author
  Last_Name:   Brown
  First_Name:  James
  Middle_Name: W.
  Email:       SPAN>TONYS::JWB
  Email:       Telemail>[JWBROWN/NASA]NASAMAIL
  Group: Address
     MS 301-433
     Jet Propulsion Laboratory
     4800 Oak Grove Dr.
     Pasadena, CA 91109
     USA
  End_Group
End_Group
```

## 2.7 Data Center

The Data Center group is a block of information identifying the data center holding the data described in the directory entry, the unique identifier used by the data center to point to the data set, and a person to be contacted at that center for information on data access. The data center name is composed of both short and long versions in the same manner as short and long sensor and data source names. If no obvious short name exists, contact the terminology control point for your discipline or NSSDC to obtain one. It will often be sufficient simply to fill in the data center short name since the DIF file recipient may have previously stored supplementary information about the major data centers. Such supplementary information briefly informs a user about the nature of the data center and how to access it for further information.

The data center contact is the person who can supply information about how the data are stored, how to obtain copies, associated costs, etc.

The *Dataset_ID* field (data set identifier) is used to store the internal identifier by which a data set is known within the data center where it is stored. The identifier may be followed optionally by a descriptive term, separated by the ">" character, to distinguish this data set from others. The ID may not necessarily be unique among the data systems. The *Dataset_ID* should be useful as information to pass to a data system if a user chooses that entry and then is connected to the data system in which it is stored. Note that a data set may be broken into several directory entries all of which would have the same data set identifier. For the reverse case, where many data sets are grouped into one directory entry, all corresponding *Dataset_IDs* should be listed. In this case, the description can help the user select a particular data set. In cases where there are a large number of *Dataset_IDs*, the location of a listing of *Dataset_IDs* should be noted in the summary.

Since the data described by a directory entry may be stored in several places, the data center group may be repeated.

EXAMPLE

```
Group: Data_Center
   Data_Center_Name:   NODS>NASA Ocean Data System
   Dataset_ID:         NODS8831>24000 high-resolution images
   Dataset_ID:         NODS8833> 1000 low-resolution images
   Group: Data_Center_Contact
      Last_name:  Lassanyi
      First_name: Ruby
      Email:      SPAN>STANS::DATASPEC
      Email:      NSN>DATASPEC@STANS.JPL.NASA.GOV
      Phone:      1-818-354-8031
      Group:  Address
         MS 300-324
         Jet Propulsion Laboratory
         4800 Oak Grove Drive
         Pasadena, CA 91109
      End_Group
   End_Group
End_Group
```

## 2.8 Originating Center

This field contains the short name of the data center that has generated the directory entry. When only a single data center is entered in the directory entry, this field may be omitted and the listed data center will be assumed to be the originating data center. When more than one data center is provided, this field **must** be included in the directory entry.

EXAMPLES

```
Originating_Center:  PDS
Originating_Center:  NSSDC
Originating_Center:  NGDC
```

## 2.9 Campaign or Project

This field should be supplied only when there is a relationship of this directory entry to a campaign or project (WOCE, FIRE, PROMIS, etc.). Campaigns or projects usually encompass data from a number of diverse data sources. The field should not be supplied if it does not differ significantly from the data source field (e.g., the VOYAGER project compared to the VOYAGER 1 and VOYAGER 2 data sources). The field includes both short and long names. If no obvious short name exists, contact the terminology control point for your discipline or the NSSDC to obtain one. It is anticipated that some directories will have supplementary information about the major campaigns and projects, so a simple indication of the campaign/project short name will be sufficient if it is known that the directory has the other information on the campaign or project. Note that either the word *Campaign* or *Project* may be used as the label for the field, as appropriate.

This field may be repeated as often as necessary.

<u>EXAMPLES</u>

```
Project:  ISTP>International Solar-Terrestrial Physics
Campaign: WOCE>World Ocean Circulation Experiment
```

## 2.10 Storage Medium

Entries in the storage medium field first indicate the quantity and type of medium on which the data are currently stored. This is followed by the volume of data, preferably in megabytes for easy comparison with other entries if this is digital data. The quantity is in the form of a number of units of the medium (e.g., ten magnetic tapes, six optical disks, 16 printed volumes, 70 microfiche reels, etc.). The medium should be chosen from standard names such as

magnetic tapes
optical disks
magnetic disk
microfilm reels
microfiche slides
hardcopy plots
35 mm slides

Details about the characteristics of the medium (6250 bpi, 5.25 inch disk, etc.) should be mentioned in the summary text if it is important for the user to know.

The storage medium field contains information on the volume of data in bytes as well as the quantity and type of medium on which the data are stored. The intent is to give the user a feeling for what will be involved in acquiring the data. Note that the storage media may differ from the media on which the data are distributed. It is assumed that the user can acquire information on the available distribution media through general online information about the data center or by contacting the data center. If these data are not available in the standard forms, this information should be indicated in the summary.

The storage medium field may be repeated as often as necessary if the data are stored in multiple forms.

<u>EXAMPLES</u>

```
Storage_medium: 20 magnetic tapes, 300 Mbytes
Storage_medium: 1 magnetic disk, 0.5 Mbytes
Storage_medium: 3 optical disks, 3400 Mbytes
Storage_medium: 2000 hardcopy plots
Storage_medium: 10 volumes printed tables
```

## 2.11 Parameter Measured

The parameter field indicates what kinds of measurements are represented by the data. The value(s) entered in this field should be selected from the list of valid values in Appendix E. It is important that all applicable parameter groups and parameters be included, since many users search for data by specifying the parameters of interest. The choice of parameter group and parameter are placed on a single line and separated by the ">" character, to indicate the hierarchy as shown in the examples below. The parameter part may be left blank (and the ">" omitted) but, again, it is best to specify all applicable parameters. Only one parameter group and parameter may be specified on a line. If more than one parameter within a single parameter group applies, multiple lines should be entered with the parameter group repeated on each. The list of allowable parameter groups and parameters is contained in Appendix E.

Finer breakdowns of parameters may be added following the parameter, separated by ">". These lower levels of breakdown may be controlled by supplemental standards or agreements used within each discipline area but are not guaranteed to be recognized or unique outside the scope of applicability of such standards or agreements. New values could be included in the list of valid parameter fields once it is determined that they are necessary and do not overlap with those already available.

This field is a required part of the DIF file. The field may be repeated as many times as necessary.

EXAMPLES

```
Parameter:  Atmospheric Dynamics>Storms
Parameter:  Astronomical Parameters>Transverse Velocities
Parameter:  Hydrologic Parameters>Turbidity
Parameter:  Radiance and Imagery>Microwave
Parameter:  Charged Particles
Parameter:  Solar Properties>Solar Wind
Parameter:  Biological Entities>Ocean Vegetation>Plankton
```

## 2.12 Discipline Keywords

The discipline keywords describe the science discipline(s) and subdiscipline(s) in which the data described in this entry are normally used. The valid discipline keywords are listed in Appendix C. It is important that all applicable disciplines and subdisciplines be included, since many users search for data by specifying their field of interest. The choices of discipline and subdiscipline are placed on a single line and separated by the ">" character to indicate the hierarchy as shown in the examples below. The subdiscipline part may be left blank (and the ">" omitted) but, again, it is best to specify all applicable keywords. Only one discipline and subdiscipline may be specified on a line. If more than one subdiscipline within a single discipline applies, multiple lines should be entered, with the discipline repeated on each. The list of allowable disciplines and subdisciplines is contained in Appendix C.

Finer breakdowns of subdisciplines may be added following the subdiscipline, separated by ">". These lower levels of breakdown may be controlled by supplemental standards or agreements used within each discipline area but are not guaranteed to be recognized or unique outside the scope of applicability of such standards or agreements.

This field may be repeated as many times as necessary.

<u>EXAMPLES</u>

```
Discipline: Earth Science>Atmosphere
Discipline: Planetary Science
Discipline: Earth Science>Land
Discipline: Astronomy>Ultraviolet Astronomy
Discipline: Earth Science>Land>Agriculture
```

## 2.13 Coverage

The coverage fields indicate (usually in very coarse resolution) the spatial coverage of the data described by the directory entry. This can be done in latitude and longitude for Earth observations. Earth science disciplines should include the coverage information for the directory entry whenever possible, even if the data being described are global.

In all cases, *Minimum_Latitude* refers to the southernmost latitude point covered, and *Maximum_Latitude* refers to the northernmost point covered. *Minimum_Longitude* refers to the westernmost longitude covered, and *Maximum_Longitude* refers to the easternmost longitude covered. Latitude and longitude values are given in whole degrees. Any finer coverage that needs to be specified should be described in the summary.

As an alternative, directional terms may be substituted for the minimum and maximum terminology for Earth-based coverage in accordance with the following correspondence:

```
Minimum_longitude --> Westernmost_longitude
Maximum_longitude --> Easternmost_longitude
Minimum_latitude  --> Southernmost_latitude
Maximum_latitude  --> Northernmost_latitude
```

Either one full set or the other full set should be used. They should not be mixed. The directionality of these terms on a map would be

```
                 Maximum_latitude
Minimum_longitude    Maximum_longitude
                 Minimum_latitude

                 Northernmost_latitude
Westernmost_longitude  Easternmost_longitude
                 Southernmost_latitude
```

In accordance with the FIPS and ANSI standards (FIPS PUB 70-1, ANSI X3.61-1986), Earth geographic coordinates must be submitted with alphanumeric or integer hemispheric indicators. When using alphanumeric characters, indicators (N, S, E, W) must be uppercase and immediately follow the last digit for latitude or longitude; no blanks are allowed. When using the integer representation (+, -) the plus sign (+) or minus sign (-) must immediately precede the longitude or latitude value.

Latitudes north of the equator are indicated by a plus sign (+) or an "*N*." Latitudes south of the equator are indicated by a minus sign (-) or an "*S*." Longitudes east of the prime meridian (Greenwich) are indicated by a plus sign (+) or an "*E*." Longitudes west of the prime meridian are indicated by a minus sign (-) or a "*W*." A point on the prime meridian shall be assigned to the Eastern Hemisphere, a point on the one hundred eightieth meridian shall be assigned to the Western Hemisphere, and a point on the equator shall be assigned to the Northern Hemisphere, and for this reason, values of 0 and 180 do not require hemispheric indicators.

For non-Earth (planetary) data sets, latitude values should be given following the same guidelines as for the Earth data. Longitude values shall be given in whole numbers representing 0-360 degrees with no hemispheric indicators. This is in accordance with the IAU cartographic guidelines. Planetary science disciplines should include the item "*Coord_System:,*" followed by the planet name (if *Coord_System* is not specified, Earth is implied). A plus sign (+) is optional for positive integers. Integer and alphanumeric indicators should not be mixed within a single DIF file.

For astronomical data sets, two different sets of fields are possible. For coordinates in the RA-Declination system, *Minimum_Dec* refers to the southernmost latitude point covered; *Maximum_Dec* refers to the northernmost latitude point covered; *Minimum_RA* refers to the westernmost longitude; and *Maximum_RA* to the easternmost longitude covered. For coordinates in the Galactic coordinate system, the equivalent terms are *Minimum_Gal_Lat, Maximum_Gal_Lat*, *Minimum_Gal_Long*, and *Maximum_Gal_Long*.

For the RA-declination system, right ascension should be entered to the nearest hour or minute, in the form "hours" followed by "*H*," followed optionally by a blank followed by "minutes" followed by "*M*." Declination and galactic coordinates follow the same guidelines as for planetary sets.

Two additional fields may appear only once within the group. The first of these is Epoch, and the other is Equinox. Values are to be entered numerically, preferably to the nearest tenth of a year.

This group may appear as often as necessary, but care should be taken when repeating the group. Each of the fields may appear only once within the group.

EXAMPLES

```
Group:  Coverage
   Minimum_Latitude:     65S
   Maximum_Latitude:     90N
   Minimum_Longitude:    71W
   Maximum_Longitude:    105E
End_Group

Group: Coverage
   Southernmost_Latitude:   -65
   Northernmost_Latitude:   +90
   Westernmost_Longitude:   -71
   Easternmost_Longitude:   105
 End_Group

Group: Coverage
   Minimum_RA:           10H 20M
   Maximum_RA:           24H
   Minimum_Dec:          -30
   Maximum_Dec:          90
   Epoch:                B1950.0
End_Group

Group: Coverage
   Minimum_Gal_Long:     335
   Maximum_Gal_Long:      15
   Minimum_Gal_Lat:       -5
   Maximum_Gal_Lat:        5
End_Group
```

## 2.14 Location Keywords

The location keywords provide the capability of selecting place names to be used as search parameters, usually as an alternative to specifying latitudes and longitudes (which may not apply in some disciplines). The keywords for the highest level should be chosen from the list in Appendix D. A list categorized by science disciplines is shown first in Appendix D followed by an alphabetized version. The keyword "Earth" is not included in the list since the term "Global" means the entire Earth, and the other terms within the Earth science category are presumed to be locations subordinate to the Earth.

If you feel a more specific place name (usually descriptive of a place contained within one of the general terms shown in Appendix D) is an important piece of information about the data, this may be specified as an additional breakdown within the hierarchy, following a ">". Lists of locations at levels below those listed in Appendix D may be controlled by supplemental standards or agreements used within each discipline area but are not guaranteed to be recognized or unique outside the scope of applicability of such standards or agreements.

Alternatively, a word implying location may be specified as a General Keyword (see the definition and examples for that field on the following page) and mentioned in the summary text. If you think a location name should be added to the list in Appendix D, contact the Master Directory User Support Office.

This field may be repeated as many times as necessary.

<u>EXAMPLES</u>

```
Location:  Jupiter
Location:  Troposphere
Location:  North America > United States > Kansas > Topeka
Location:  Atlantic Ocean > North Atlantic Ocean > Sargasso Sea
```

## 2.15 General Keywords

This field provides the capability of entering general keywords that are not found in the parameter, discipline, or location keywords. It could be used, for example, to specify fine resolution location words or more specific discipline-dependent words or phenomena. Any words or phrases may be entered, but they should be kept short to facilitate their use as meaningful keys into the text. The user will have to specify the keyword exactly as it is entered in this field in order to retrieve this directory entry.

This field may be repeated as many times as necessary.

<u>EXAMPLES</u>

```
Keyword:   Mount St. Helens
Keyword:   quasar
Keyword:   flare
Keyword:   eddy
Keyword:   lightning
```

## 2.16 Revision Date

This represents the date and possibly the time that this directory entry was created or the latest date and time of its modification or update. Usually the date without time will be sufficient.

This field may appear only once.

EXAMPLES

```
Revision_Date: 1987-10-01
Revision_Date: 1987-06-09T04:10:00Z
```

## 2.17 Science Review Date

This represents the date and time of the latest review of the directory entry for accuracy of scientific or technical content. It is suggested that this review be done by the investigator or a member of the science team that produced the data. Usually the date will be sufficient, though a time may also be given.

This field may appear only once.

EXAMPLES

```
Science_Review_Date: 1954-07-04
Science_Review_Date: 1987-06-09T04:10:00
```

## 2.18 Future Review Date

This date, suggested by the author, indicates a time at which the DIF file should be reviewed for technical content. On or soon after that date, a request will be made to the author to review the DIF file and submit an updated version, if necessary (either the author or a knowledgeable person to whom the author refers the DIF file would do the review). Normally, the content of the directory entry should be reviewed at regular intervals of the order of a year or more. If this will be done, this field may be omitted. If the author wishes to specify a particular review date or has reason to believe that significant changes will occur before a year, a suggested review date can be included and this date will take precedence. Significant changes can include an anticipated change in the contact person or author fields; planned changes to the data content (e.g., change in processing algorithm); regular changes in the stop date, which are frequent but not so frequent as to justify leaving the stop date blank; anticipated change in the storage location for the data; expected inclusion of the data as part of a campaign, etc.

This field may appear only once.

EXAMPLES

```
Future_Review_Date: 1989-01-01
Future_Review_Date: 1989-06-15
```

## 2.19 Reference

The reference text group should contain a few key bibliographic references pertaining to the directory entry. It is recommended that bibliographic references be provided in the style used by the *Journal of Geophysical Research* (JGR).

This field may appear only once.

EXAMPLES

```
Group: Reference

    Kolenkiewiecz, R. and Martin, C. F., Seasat altimeter height
    calibration, J. Geophys. Res., 87 (C5), 3189-3198, 1982.

    Tapley, B. D. and Born, G. H., The Seasat precision orbit
    determination experiment, J. of Astro. Sci., 28 (4), 315-326, 1980.

End_Group
```

## 2.20 Quality

The quality text group is composed of unstructured text containing information about any quality procedures followed in producing the data described by this entry. Any other indicators of data quality or, in contrast, recognized or potential problems with quality (e.g., successful or unsuccessful usage by the research community) should be included. The quality description should be succinct. When established quality control mechanisms are used, these should be included in this section. When possible, established quantitative quality measurements applicable to the entry should be included. References can be mentioned in this section but should also be included in the reference section.

This group may appear only once.

<u>EXAMPLES</u>

```
Group:  Quality

This data entry has been processed using the NASA Planetary Data System
quality control peer review.

End_Group

Group:  Quality

The data set has been documented and peer reviewed in the publication: King,
J. H., OMNI, Online Interplanetary Data Access, J. Geophys. Res., V, nnnn-
mmmm, 1992.

End_Group

Group:  Quality

The data set has been in extensive use for over 5 years by many researchers
and has resulted in multiple publications.

End_Group

Group:  Quality

For good quality results in the use of these data it is recommended that
researchers contact the principal investigator regarding processing methods.

End_Group
```

## 2.21 Summary

The summary text group is composed of unstructured text containing information about the directory entry that cannot be found in the previous fields. The summary should be a concise abstract and should contain brief statements of important information for the potential user. It should, where possible, include

- a discussion of the parameters measured by the data (accuracy, precision, etc.),
- statements of time, spatial resolution, coverage, and frequency of updates or modifications to the data set (e.g., monthly addition of newly processed data or acquisition of additional coverage),
- data processing level,
- a discussion of ancillary data sets needed for processing,
- the similarities and differences of these data to other closely-related data sets,
- ordering information unique to this particular data set,
- sensor and source information unique to this particular data set,
- other information needed for a user to determine the usefulness of the data set (e.g., what the user would need in order to process this data).

In addition, the summary should have the following characteristics.

- It should be suitable for presentation on a standard computer terminal (80-character width × 24-line height).
- It should not exceed two or three screen pages (300-500 words).
- It should be written using standard elements of style.
- It should contain only standard alphanumeric characters A-Z, *a-z*, *0-9*, and ! @ $ % & * ( ) { } [ ] | _ - = + ` ~ > < ; : ' " ? /, and no special characters (e.g., no TABs, form feeds, Greek letters, etc.).
- It should have ragged right margins (i.e., not right justified).
- It should be single spaced with blank lines separating paragraphs.
- It should be proofread for spelling, typing, and grammar.

The summary text field may also contain tabular information in cases where this is an effective way to convey information about a data set to a user.

This field is a required part of the DIF file. The field may appear only once.

## EXAMPLE

Group: Summary

Seasat was launched on June 28, 1978 carrying a five sensor payload. The objective of the Altimeter (ALT) was to determine ocean topography with a height measurement precision of 10 cm. The ALT carrier frequency was 13.5 GHz and operated in chirp pulse mode with a 3.2 micro-sec uncompressed pulse width and 3.125 ns compressed pulse width. The pulse limited footprint diameter was 1.2 km for calm seas; beam-limited footprint diameter was 22.2 km.

The primary parameters telemetered to the ground processing system at 10/sec rate were height, significant wave height, and Automatic Gain Control (AGC). The height, described herein, is the sea surface height with respect to the reference ellipsoid. From altimeter workshop results, the height measurement bias has been determined as 0.0 +/- 0.7 m when the sea state bias effects are modeled.

Height data are available on 1600 or 6250 bpi magnetic tapes for: Level 1 Sensor Data Record, Level 1.5 Sensor File and Level 2 Geophysical Data Record. Level 2.5 data sets are maintained on-line by the NODS archive system. Full tape copies will be made on request. Please specify the period of interest when ordering. Allow 1-3 weeks for delivery depending on the order size.

End_Group

# Appendix A

# Formal Syntax

## Purpose

This appendix is divided into three sections. The first provides the general format of the syntax formalism adopted for the manual. The next provides the syntax for the overall structure of the DIF file. The third provides the detailed syntax for each of the DIF file fields.

The following formal syntax definition is not intended to be sufficiently precise to be used as input to a parser generator. It is intended to be readable by the user of the DIF manual.

# A.1 General Syntax Rules

Notation:

*m{xxx}n* means item(s) within braces occurs at least *m* times but not more than *n* times. If *n* is stated as "*n*" rather than an integer constant, then the item may occur an arbitrary number of times. However, a large number of repetitions is not generally encouraged.

\+ means concatenation.

| means choose any single alternative.

Spaces are allowed and optional where + is used for concatenation.

## Rules and Conventions

Entries may be multi-line. Two methods may be used to indicate the continuation of an entry. Either the last non-blank character of each line contains "&" to indicate that the entry value is continuing, or the entire entry value is enclosed in quotation marks or apostrophes. Note, however, the quotation mark and apostrophe should not be used for continuation in textline groups such as Address, Reference, and Summary.

Any value field or portion of a value field separated by ">" may be enclosed in quotation marks or apostrophes. The rules are

- If a value has an opening apostrophe, it must be terminated by an apostrophe and must not contain any internal apostrophes; if a value has an opening quotation mark, it must be terminated by a quotation mark and must not contain any internal quotation marks.
- Special characters ">" and "&" do not have their normal functions inside values enclosed in quotation marks or apostrophes and are treated as regular textual characters.
- The enclosing quotation marks or apostrophes are not part of the value.
- The value obtained after removing the enclosing quotation marks or apostrophes must be a valid value.
- The use of a quotation mark or apostrophe implies line continuation until the closing matching quotation mark or apostrophe is found.
- Whether enclosing quotation marks or apostrophes are used or not, leading and trailing spaces are not part of the value.

If an unrecognized keyword is present, any program reading a DIF file should ignore the line or group introduced by that keyword. It is a local option whether to issue a warning message. Any unrecognized keyword in the form

```
keyword ":"|"=" textline
```

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should be ignored. However, the textline must be parsed to be sure to find and ignore any continuation. Any unrecognized input in the form

```
group ":"|"=" keyword
```

should ignore the entire group, up to the matching *End_Group*. However, the group must be parsed in order to find the correct matching *End_Group*.

Field labels begin at the first non-blank character on a line.

Field labels end with colon or an equal sign, preceded and/or followed by zero or more spaces, except the label *End_Group*, which does not contain a colon or equal sign.

Field labels should have only the first letter capitalized (style standard), but recognizer should be case-insensitive.

The parameter value associated with a field label is delimited by end-of-line unless explicitly continued as described above.

Where the syntax specifies an *h_spec* (concatenation with ">" character, see definition in syntax), which consists of a variable number of terms implying a hierarchy, a DIF file may contain more levels of hierarchy than a particular directory implementation can use or validate. These extra levels should be retained and displayed as text where possible but need not be validated or searchable.

The complete file should be human readable exactly as delivered.

Only printable ASCII characters shall be used: No TABs, no backspaces, or attempts at underlining.

Use ragged right margins, no right justification.

A "*word*" is 1 to 31 alphanumeric characters, with embedded "_", "-", ".", "/" allowed, delimited by space and/or comma and/or ">".

A "*textline*" is any text not beginning with "*End_*", ending at end-of-line or end-of-continuation.

The end-of-line character is the new line character (ASCII decimal 10).

## A.2 Overall Structure

DIFs shall be transferred according to one or more of the following protocols:

1. Network file transfers that preserve byte order.
2. Unlabeled 0.5 inch magnetic tape in the following densities: 1600 bpi, 6250 bpi.
3. ANSI/ISO standard-labeled 0.5 inch magnetic tape with the following densities: 1600 bpi, 6250 bpi.
4. Other transfer protocols as agreed upon.

A directory entry is defined as follows:

```
Directory_entry ::=
   Entry_ID +
   Entry_Title +
   0{Start_Date}1 +
   0{Stop_Date}1 +
   0{Sensor_Name}n  +
   0{Source_Name}n  +
   0{Investigator}n +
   0{Technical_Contact}1 +
   0{Author}1 +
   1{Data_Center}n +
   0{Originating_Center}1 +
   0{Campaign_or_Project}n +
   0{Storage_Medium}n +
   1{Parameter}n +
   0{Discipline}n +
   0{Coverage}n +
   0{Location}n +
   0{Keyword}n +
   0{Revision_Date}1 +
   0{Science_Review_Date}1 +
   0{Future_Review_Date}1 +
   0{Reference}1 +
   0{Quality}1 +
   Summary
```

**Note:** Fields in the *Directory_Entry* may be in any order except the *Entry_ID*, which must appear first.

# A.3 Field Syntax

```
Entry_ID ::= "Entry_ID" + ":"|"=" + word

  Word ::= 1 to 31 characters, from set
           {alphanumeric, "_," "-," ".," "/"}
           delimited by spaces and/or commas and/or ">"
           and/or end of line

Entry_Title ::= "Entry_Title" + ":"|"=" + textline

  textline ::= 1 to 80 characters from the printable ASCII
               character set plus continuation if any.

Start_Date ::= "Start_Date" + ":"|"=" + Date_time

Stop_Date   ::= "Stop_Date" + ":"|"=" + Date_time

  Date_time ::= yyyy-mm-ddThh:mm:ssZ
                         (Thh:mm:ssZ part is optional and may be
                          omitted if time is not significant;
                          the final "Z" should be omitted if time is
                          not GMT (UTC))

Sensor_Name ::= "Sensor_Name" + ":"|"=" +
                   Sensor_short + 0{">" + Sensor_long}1
  Sensor_short ::= word
  Sensor_long  ::= textline

Source_Name ::= "Source_Name" + ":"|"=" +
                   Source_short + 0{">" + Source_long}1
  Source_short ::= word
  Source_long  ::= textline

Investigator ::= "Group" + ":"|"=" + "Investigator" +
                    Personal_data + "End_Group"

Technical_contact ::= "Group" + ":"|"=" + "Technical_contact" +
                        Personal_data + "End_Group"

Author ::= "Group" + ":"|"=" + "Author" +
              Personal_data + "End_Group"

Data_Center ::="Group" + ":"|"=" + "Data_Center" +
                 Data_Center_info + "End_Group"

Data_Center_info ::=
   Data_Center_Name +
   1{Dataset_ID}n +
   Data_Center_Contact

Data_Center_Name ::="Data_Center_Name" + ":"|"=" +
                      Center_short + 0{">" + Center_long}1
Center_short ::= word
Center_long  ::= textline
Dataset_ID ::= "Dataset_ID" + ":"|"=" + textline +
               0{">" + textline}1
```

```
Data_Center_Contact ::=
       "Group" + ":"|"=" + Data_Center_Contact" +
                           Personal_data +
                           "End_Group"

Originating_Center ::= "Originating_Center" + ":"|"=" +
                       Center_short

Personal_data ::=
   Last_name +
   First_name +
   0{Middle_name}1 +
   0{Email_address}5 +
   0{Phone}2 +
   Address

Last_name      ::= "Last_name" + ":"|"=" + word
First_name     ::= "First_name" + ":"|"=" + word
Middle_name    ::= "Middle_name" + ":"|"=" + word
Email_address ::= "Email" + ":"|"=" +
                   Network_name + ">" + Network_address
Network_name  ::= word
   where word is one of:
      "SPAN", "Telemail", "Internet", "NSI/DECnet", "BITNET", "OMNET"
Network_address ::= textline
Phone ::= "Phone" + ":"|"=" + textline
Address ::= "Group" + ":"|"=" + Address +
            1{textline}5 + "End_Group"

Campaign_or_Project ::=
  "Campaign" | "Project" + ":"|"=" +
                c_p_short + 0{">" + c_p_long}1

   c_p_short ::= word
   c_p_long ::= textline

Storage_medium ::= textline

Parameter ::= "Parameter" + ":"|"=" + h_spec
```

(See Appendix E.)

```
   h_spec ::= word + 0{">" + word}n

Discipline ::= "Discipline" + ":"|"=" + h_spec
```

(See Appendix C.)

```
Coverage ::= "Group" + ":"|"=" + "Coverage" +
              Lat_Long_Coverage | RA_Dec_Coverage | Gal_Coverage +
             "End_Group"

   Lat_Long_Coverage ::= Minimum_latitude  +
                         Maximum_latitude  +
                         Minimum_longitude +
                         Maximum_longitude +
                         0{Coord_system}1

   RA_Dec_Coverage ::= Minimum_RA  +
                       Maximum_RA  +
```

```
                      Minimum_Dec +
                      Maximum_Dec +
                      0{Epoch}1   +
                      0{Equinox}1

Gal_Coverage ::= Minimum_Gal_Lat  +
                 Maximum_Gal_Lat  +
                 Minimum_Gal_Long +
                 Maximum_Gal_Long +
                 0{Epoch}1        +
                 0{Equinox}1

Minimum_latitude  ::= "Minimum_latitude"  + ":"|"=" + Lat_spec
Maximum_latitude  ::= "Maximum_latitude"  + ":"|"=" + Lat_spec
Minimum_longitude ::= "Minimum_longitude" + ":"|"=" + Lon_spec
Maximum_longitude ::= "Maximum_longitude" + ":"|"=" + Lon_spec
Coord_system ::= "Coord_System" + ":"|"=" + Co_Sys
Minimum_RA ::= "Minimum_RA" + ":"|"=" + RA_spec
Maximum_RA ::= "Maximum_RA" + ":"|"=" + RA_spec
Minimum_Dec ::= "Minimum_Dec" + ":"|"=" + Lat_spec
Maximum_Dec ::= "Maximum_Dec" + ":"|"=" + Lat_spec
Minimum_Gal_Lat  ::= "Minimum_Gal_Lat"  + ":"|"=" + Lat_spec
Maximum_Gal_Lat  ::= "Maximum_Gal_Lat"  + ":"|"=" + Lat_spec
Minimum_Gal_Long ::= "Minimum_Gal_Long" + ":"|"=" + Lon_spec
Maximum_Gal_Long ::= "Maximum_Gal_Long" + ":"|"=" + Lon_spec
Epoch ::= "Epoch" + ":"|"=" + Yyyyf
Equinox ::= "Equinox" + ":"|"=" + Yyyyf

Lat_spec ::= signed integer in [-90,90] | integer in [0,90]
             + "N"|"S"
Lon_spec ::=signed integer in [-180,180] | integer in [0,180]
            + "E"|"W"
```

where N indicates latitudes north of the Equator [0 degrees N or S], S indicates latitudes south of the Equator, E indicates longitude east of Greenwich - the Prime Meridian [0 degrees E or W], and W indicates longitude west of Greenwich,

and where (-) indicates latitudes south of the equator (or ecliptic) or longitudes west of the prime meridian (Greenwich), and (+) indicates latitudes north of the equator (or ecliptic) or longitudes east of the prime meridian (or vernal equinox or galactic center).

```
RA_spec ::= integer in [0,24] + "H" + 0{" " +
            integer in [0,180] + "M"}1

Yyyyf ::= word

Co_sys ::= "Earth" | planet
```

where planet is a planet name from those listed in the location keyword list (Appendix D).

```
Location ::= "Location" + ":"|"=" + h_spec
```

(See Appendix D.)

```
Keyword ::= "Keyword" + ":"|"=" + word

Revision_Date ::= "Revision_Date" + ":"|"=" + Date_Time

Science_Review_Date ::= "Science_Review_Date" + ":"|"="
                        + Date_Time

Future_Review_Date ::= "Future_Review_Date" + ":"|"="
                       + Date_Time

Reference :: "Group" + ":"|"=" + "Reference"
             + 1{textline}n + "End_Group"

Quality::= "Group" + ":"|"=" + "Quality" +
    1{textline}n + "End_Group"

  Summary ::= "Group" + ":"|"=" + "Summary"
              +  1{textline}n + "End_Group"
```

# Appendix B

# Overall Examples

## Purpose

This appendix provides overall examples for the construction of DIF files. The examples present a range of different data set types and their translations into directory entries.

# Overall Examples

1. The following DIF file example presents an NSSDC multiple data set directory entry. Four data sets from the NSSDC inventory are aggregated into a single entry in this example.

```
Entry_ID:      78-041A-01A
Entry_Title:  "Heat Capacity Mapping Mission (HCMM) Visible and IR Imagery and
Day/Night Registered Imagery"
Start_date:    1978-06-06
Stop_date:     1980-09-07
Sensor_name:   HCMR>HCMM RADIOMETER
Source_name:   HCMM>HEAT CAPACITY MAPPING MISSION
Group: Investigator
   First_name: W.
   Last_name: BARNES
 Group: Address
      CODE 625
      NASA-GSFC
      GREENBELT, MD  20771
   End_Group
End_Group
Group: Technical_Contact
   First_Name: L.
   Last_Name: Stuart
   Phone: (301) 286-3157
 Group: Address
      CODE 620
      NASA-GSFC
      GREENBELT, MD 20771
 End_Group
End_Group
Group: Data_Center
 Data_Center_Name: NSSDC
 Dataset_Id:   78-041A-01A
 Dataset_Id:   78-041A-01B
 Dataset_Id:   78-041A-01C
 Dataset_Id:   78-041A-01D
Group: Data_Center_Contact
  First_name: Carolyn
  Last_name:   Ng
  Phone:    (301) 286-4088
  Email:   SPAN>NSSDCA::NG
 End_Group
End_Group
Group:Data_Center
 Data_Center_Name: ESA> Earthnet User Services, Frascati
 Dataset_ID:   HCMM
Group:Data_Center_Contact
Last_Name:
 Group:Address
  Earthnet User Services
  C.P. 64
  00044  Frascati  Italy
 End_Group
 End_Group
```

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```
End_Group
 Storage_Medium:     151025 FEET 9.5 IN. BLACK AND WHITE NEGATIVE
 Storage_Medium:      304 TAPES , 310 TAPES (day/night reg.)
 Storage_Medium:    7800 FT 9.5 in. BLACK AND WHITE NEGATIVE (day/night reg)
 Parameter:  Radiance and Imagery> Visible
 Parameter:  Radiance and Imagery> Infrared > Thermal Ir Imagery
 Parameter:  Earth Radiative Processes  > Thermal Inertia
 Parameter:  Earth Radiative Processes > Temperature
 Parameter:  Geography And Land Cover
 Parameter:  Crustal Composition > Temperature
 Discipline: Earth Science > Interior And Crust
 Discipline: Earth Science > Land
 Location:   Australia
 Location:   North America
 Location:   Europe
 Keyword:  Albedo
 Keyword: Temperature
 Keyword: Thermal Inertia
 Keyword: Earth Imagery
 Keyword: Mapping
 Keyword: Soil Temperature
 Keyword: Geology
Group: Coverage
 Maximum_latitude:  85N
 Minimum_latitude:   55S
 Minimum_longitude:  180W
 Maximum_longitude:  180E
End_Group
 Revision_Date: 1988-04-13
Group: Summary
```

The Heat Capacity Mapping Mission Radiometer (HCMR) which flew on board the Heat Capacity Mapping Mission (HCMM) collected visible and thermal infrared day/night data which may be useful for a variety of Earth science studies such as making thermal inertia studies for the discrimination of rock types and mineral resource location, measuring plant canopy temperatures, observing soil temperature cycles, and mapping natural and man-made thermal effluents.

The HCMM local times of equator crossings were 2 PM (ascending node) and 2 AM (descending node). This provided day/night coverage about once every 16 days at approximately 12-hour intervals depending on latitude. The HCMM provided global coverage from 85 N to 85 S, but due to the lack of onboard recorders, image acquisition was limited by the availability of ground receiving stations. Areas covered include parts of the United States, western Canada, western Europe, northern Africa, and eastern Australia. The spatial resolution for this data is approximately 600 m at nadir for the IR channel (10.5 - 12.5 micrometers) and 500 m for the visible channel (0.5 - 1.1 micrometers). Specific coverage information is available from NSSDC.

HCMM radiometer image data are available in both film (NSSDC ID 78-041A-01A) and digital (CCT) format (NSSDC ID 78-041A-01B) at a scale of 1:4,000,000. The film products are on 241-mm rolls (totalling about 25,000 scenes), and are available as positive or negative prints or transparencies and contain, in addition to the actual imagery, annotation information, a gray scale, frame identification (id), resolution targets, registration marks, and tick marks (Hotine oblique mercator coordinates). Digital HCMM data are arranged in a band sequential (BSQ) format.

In addition, HCMM images are available as day/night registered imagery in both film (NSSDC ID 78-041A-01C) and digital format (NSSDC ID 78-041A-01D), also with a scale of 1:4,000,000. These day/night registered data consist of five types of images: visible, day thermal infrared, night thermal infrared, the temperature difference, and the apparent thermal inertia. Day/night registered data also contain a 16-step gray scale, time and location annotation, geometric correction information, etc.

All HCMM data are available from the NSSDC. HCMM data acquired at Lannion, France, may also be ordered from ESA Earthnet User Services.

End_Group
Group: Reference

Kahle, A. B., J. P. Schieldge, M. J. Abrams, R. E. Alley, and C. J. LeVine, Geologic Applications of Thermal Inertia Imaging Using HCMM Data. JPL Publication 81-55, Pasadena, CA, 1981.

Price, J. C., Heat Capacity Mapping Mission (HCMM) Data Users Handbook for Applications Explorer Mission (AEM), NASA/GSFC, Greenbelt, MD, 1980 (Available from NSSDC).

Short, Nicholas M. and Locke Stuart, "The Heat Capacity Mapping Mission (HCMM) Anthology," NASA SP-465, 1982.
End_Group

2. The following is an example of a multi-data source, multi-sensor directory entry from the NASA Climate Data System. Note that the DIF file does not capture the relationship between a specific sensor and a specific source.

```
 Entry_ID:      ISCCPB
 Entry_Title:  "Global Radiance Data from International Satellite
 Cloud Climatology Project (ISCCP-B)"
 Parameter:      Radiance and Imagery > Visible
 Parameter:      Radiance and Imagery> Infrared
 Sensor_name: AVHRR>ADVANCED VERY HIGH RESOLUTION RADIOMETER
 Sensor_name: VAS>VISSR ATMOSPHERIC SOUNDER
 Sensor_name: MIR>MULTISPECTRAL IMAGING RADIOMETER
 Sensor_name: VISSR>VISIBLE INFRARED SPIN SCAN RADIOMETER
 Source_name: NOAA-7
 Source_name: NOAA-8
 Source_name: NOAA-9
 Source_name: GOES-5
 Source_name: GOES-6
 Source_name: METEOSAT-2
 Source_name: GMS-1
 Source_name: GMS-2
 Source_name: GMS-3
 Source_name: NOAA-10
Start_date: 1983-07-01
Group:Technical_Contact
   First_name: William
   Last_name:  Rossow
   Phone: 202-678-5500
 Group:Address
    ISCCP Global Processing Center
    NASA Goddard Institute for Space Studies
    2880 Broadway
    New York, NY  10025
 End_Group
End_Group
Group: Data_Center
  Data_Center_Name:     NOAA/NESDIS/NCDC
  Dataset_ID:      ISCCPB
Group:Data_Center_Contact
  Last_name:  Horvitz
  First_name: Andrew
  Phone: 301-763-8111
Group:Address
   Satellite Data Service Division
   World Weather Building, Room 100
   Washington, DC  20233
End_Group
End_Group
End_Group
Group: Data_Center
  Data_Center_Name:    PCDS
  Dataset_ID:      ISCCPB
End_Group
Project:  ISCCP>International Satellite Cloud Climatology Program
Originating_center:  NCDS
Storage_medium:  144 tapes/year (B3)  1640 tapes/year (B1)
Discipline:  Earth Science > Atmosphere
```

```
Location: Global
Keyword: Cloud
Keyword: Climatology
Keyword: Meteorology
Group: Coverage
Southernmost_latitude:  -90
Northernmost_latitude:   90
Westernmost_longitude: -180
Easternmost_longitude:  180
End_Group
Group: Summary
```

This data set contains visible and infrared radiance data from imaging radiometers (AVHRR, MIR, and VISSR) onboard several satellites (NOAA, GOES, and METEOSAT) collected as part of the International Satellite Cloud Climatology Project (ISCCP) which focuses on the derivation of a global climatology of cloud radiative properties. The ISCCP covers a five-year period July 1983 through June 1988.

These radiance values have been reduced from the original resolutions of each of the satellites and are available at 10km resolution (ISCCP-B1) or 30km resolution (ISCCP-B3). In addition, radiances were temporally reduced to observations sampled every 3 hours, with the exception of GMS-2 and the polar orbiters. In processing radiances observed by different satellites, radiance values were normalized to a single standard radiometer the calibrations of geostationary radiometers compared to the AVHRR sensor carried on the NOAA polar orbiter.

The ISCCPB radiance data set is being processed through the cooperation of several processing centers. The ISCCP-B1 (10km resolution) data will be available on approximately 1988 6250-bpi tapes per year. The ISCCP-B3 (30km resolution) will be available on approximately 144 6250-bpi tapes per year. The ISCCP data are archived at the ISCCP Central Archive at NOAA/NESDIS. ISCCP-B3 data are also available through NASA's Climate Data System (NCDS). The ISCCP Cloud Property data set (ISCCP-C) may also be of interest. This data set contains cloud, atmospheric, and surface parameters derived from the ISCCP-B radiance data and other ancillary data.
End_Group
Group:  Reference

World Climate Research Programme, November 1982. The International Satellite Cloud Climatology Project Preliminary Implementation Plan. World Meteorological Organization. WCP-35.

World Climate Research Programme, April 1985. The International Satellite Cloud Climatology Project (ISCCP) -- Catalog of Data and Products, WCP-95.

Rossow, W. B., E. Kinsella, A. Wolf, L. Garder, July 1985. International Satellite Cloud Climatology Project Description of Reduced Resolution Radiance Data. WMO TD-No. 58, World Meteorological Organization / International Council of Scientific Unions.

Schiffer, R. A. and W. B. Rossow, 1985. "ISCCP Global Radiance Data Set: A New Resource for Climate Research," Bull. Am. Meteor. Soc. 66:1498-1505.

Schiffer, R. A. and W. B. Rossow, 1983. "The International Satellite Cloud Climatology Project: The First Project of the World Climate Research Programme," Bulletin of the American Meteorological Society 64: 7, 779-784.
End_Group

3. The following is another example of a multi-data source, multi-sensor directory entry from the NASA Ocean Data System.

```
Entry_ID:    THEP
Entry_Title: "The TOGA Heat Exchange Project Sea Surface Temperature,
Integrated Water Vapor, Surface-Level Wind Speed and Latent Heat Flux (THEP)"
Sensor_Name:          SMMR>Scanning Multichannel Microwave Radiometer
Source_Name:          NIMBUS-7
Start_Date:           1980-1-1
Group:     Investigator
   Last_Name:         Liu
   First_Name:        Tim
   Email:             SPAN>STANS::WTL
   Group:   Address
          Ms 169-236
          Jet Propulsion Laboratory
          4800 Oak Grove Drive
          Pasadena, CA 91109
          USA
   End_Group
End_Group
Group:     Technical_Contact
   Last_Name:            Mock
   First_Name:           Don
   Email:                SPAN>STANS::DRM
   Phone:                (818)399-9362
   Phone:                 FTS 977-9362
   Group:   Address
          MS 169-236
          Jet Propulsion Laboratory
          4800 Oak Grove Drive
          Pasadena, CA 91109
          USA
   End_Group
End_Group
Group:    Author
    Last_Name:   Smith
    First_Name:  Elizabeth
    Middle_Name: A.
    Phone:   818-354-6980
End_Group
Originating_Center:         NODS
Group:   Data_Center
   Data_Center_Name:        NODS>NASA Ocean Data System
   Dataset_ID:              THEP
  Group:   Data_Center_Contact
    Last_Name:              Lassanyi
    First_Name:             Ruby
    Email:                  SPAN>STANS::DATASPEC
    Phone:                  818-354-1762
    Group:  Address
           MS 202-101
           Jet Propulsion Laboratory
           4800 Oak Grove Drive
           Pasadena, CA 91109
           USA
    End_Group
```

```
  End_Group
End_Group
 Storage_Medium:         ON-LINE
GROUP: coverage
 Minimum_Latitude:       -30
 Maximum_Latitude:       +30
 Minimum_Longitude:      0
 Maximum_Longitude:      360
End_group
Discipline:               Earth Science>Ocean
Discipline:               Earth Science>Atmosphere
 Parameter:              Ocean Dynamics>Temperature>Sea Surface Temperature>sst
 Parameter:              Ocean Dynamics>Wind>Wind Speed
 Parameter:              "Atmospheric Composition>Water Vapor>Integrated Water
                         Vapor"
 Parameter:              Earth Radiative Processes>Heat Flux>Latent Heat Flux
 Keyword:                Oceanography
 Keyword:                Physical Oceanography
 Keyword:                Air-Sea Interaction
 Keyword:                Sea Surface Temperature
 Keyword:                Tropical Oceans
 Revision_Date:          1987-10-27
 Science_Review_Date:    1987-10-27
Group:    Summary

The Scanning Multichannel Microwave Radiometer (SMMR) is a passive microwave
radiometer measuring dual polarized microwave radiation from the Earth's
surface and atmosphere in 5 frequencies:  6.63, 10.69, 18.0, 21.0 and 37.0
GHz.  SMMR swath width is 600 km.  SMMR flew aboard the NIMBUS-7 platform
which has a height of 950 km and an inclination of 99.3 degrees.

The TOGA Heat Exchange Project (THEP) will make available processed satellite
data to the NODS archive system.  This data set represents the first phase of
a two phase project.  The data parameters are:  sea surface temperature,
(degrees centigrade), integrated water vapor (grams/cm**2), surface-level wind
speed (m/s) and latent heat flux (W/m**2).  THEP data covers the tropical
oceans from 30 degrees south latitude to 30 degrees north latitude, with an
areal resolution of 2 degrees latitude by 2 degrees longitude.  The data
begins in January 1980 and is ongoing.  Monthly averages of the parameters are
available.
End_Group
```

4. The following is a sample Planetary Data System directory entry using an alternative DIF syntax.

```
ENTRY_ID                        = VUI_CDROM
ENTRY_TITLE                     = "VOYAGER URANUS IMAGES"
START_DATE                      = 1986-01-23
STOP_DATE                       = 1986-01-25
SOURCE_NAME                     = VGR2>VOYAGER_2
SENSOR_NAME                     = NA>NARROW_ANGLE_CAMERA
SENSOR_NAME                     = WA>WIDE_ANGLE_CAMERA
GROUP = INVESTIGATOR
 LAST_NAME                      = SMITH
 FIRST_NAME                     = BRAD
END_GROUP
GROUP = TECHNICAL_CONTACT
  LAST_NAME                     = SODERBLOM
  FIRST_NAME                    = LARRY
END_GROUP
GROUP = DATA_CENTER
  DATA_CENTER_NAME              = PDS
  DATASET_ID                    = VUI_CDROM
  GROUP = DATA_CENTER_CONTACT
    LAST_NAME                   = MARTIN
    FIRST_NAME                  = MICHAEL
    PHONE                   = "818-354-8751"
    GROUP = ADDRESS
                                   JET PROPULSION LABORATORY
                                   SYSTEMS ENGINEERING SECTION
                                   4800 OAK GROVE DRIVE
                                   PASADENA CA 91109
                                   USA
     END_GROUP
    EMAIL                       = SPAN>"JPLPDS::MMARTIN"
    EMAIL                       = TELEMAIL>"MIKEMARTIN/NASA"
    EMAIL                       = ARPANET>"MMARTIN@JPL.MILVAX"
  END_GROUP
END_GROUP
STORAGE_MEDIUM                  =  1 CDROM
PARAMETER                       = RADIANCE AND IMAGERY > VISIBLE
DISCIPLINE                      = PLANETARY SCIENCE > PLANETARY GEOLOGY
DISCIPLINE                      = PLANETARY SCIENCE > SMALL BODIES
LOCATION                        = URANUS
LOCATION                        = RINGS (PLANETARY)
KEYWORD                         = GEOLOGY
KEYWORD                         = ATMOSPHERES
KEYWORD                         = SATELLITES
KEYWORD                         = PLANETARY IMAGERY
REVISION_DATE                   = 1986-12-31
SCIENCE_REVIEW_DATE             = 1987-02-13
GROUP = SUMMARY

"THIS DATA SET CONTAINS 800 IMAGES RETURNED BY THE VOYAGER 2 SPACECRAFT AS IT
PASSED BY THE PLANET URANUS IN JANUARY 1986.  IT CONTAINS THE IMAGES GATHERED
DURING THE CLOSEST ENCOUNTER PERIOD AND INCLUDES ALL THE IMAGES OF THE
PLANET'S RINGS AND SATELLITES.  INDIVIDUAL IMAGES CONSIST OF 800 LINES BY 800
SAMPLE VALUES WITH EACH SAMPLE REPRESENTING AN 8-BIT BRIGHTNESS MEASUREMENT."
END_GROUP
```

5. The following two DIF file examples from the Planetary Data System (PDS) illustrate the concept of creating two directory entries for one data set. In this case a large gap in the time coverage dictated the division of the data set into two directory entries.

```
ENTRY_ID                          = MARS_CLD_CAT_1
ENTRY_TITLE                        = "MARS CLOUD CATALOG"
START_DATE                        = 1971-09-01
STOP_DATE                         = 1972-09-30
SENSOR_NAME                       = CAMERA_A>NARROW_ANGLE_CAMERA
SENSOR_NAME                      = CAMERA_B>WIDE_ANGLE_CAMERA
SOURCE_NAME                       = M9>MARINER_9
GROUP = INVESTIGATOR
  LAST_NAME                       = KAHN
  FIRST_NAME                      = RALPH
END_GROUP
GROUP = TECHNICAL_CONTACT
  LAST_NAME                       = KAHN
  FIRST_NAME                      = RALPH
END_GROUP
GROUP = AUTHOR
   LAST_NAME                    = LEE
   FIRST_NAME                   = STEVEN
END_GROUP
GROUP = DATA_CENTER
  DATA_CENTER_NAME                = PDS>PLANETARY DATA SYSTEM
  DATASET_ID                      = MARS_CLD_CAT
  GROUP = DATA_CENTER_CONTACT
     LAST_NAME                    = LEE
     FIRST_NAME                   = STEVEN
  END_GROUP
END_GROUP
STORAGE_MEDIUM                    = 1 MAGNETIC_TAPE
PARAMETER                         = ATMOSPHERIC COMPOSITION > CLOUD > CLOUD_TYPE
PARAMETER                         = ATMOSPHERIC DYNAMICS > WIND > WIND_DIRECTION
PARAMETER                         = "ATMOSPHERIC COMPOSITION > AIR QUALITY >
                                    HAZE_OPACITY"
PARAMETER                         = "ATMOSPHERIC COMPOSITION > AIR QUALITY >
                                    HAZE_QUALITY"
DISCIPLINE                        = PLANETARY SCIENCE > PLANETARY ATMOSPHERES
LOCATION                          = MARS
KEYWORD                           = LIMB_POSITION
KEYWORD                           = ATMOSPHERES
KEYWORD                           = CLOUDS
KEYWORD                           = WIND
KEYWORD                           = MARTIAN METEOROLOGY
REVISION_DATE                     = 1987-01-31
SCIENCE_REVIEW_DATE               = 1984-01-01
GROUP = REFERENCE
     'KAHN, JGR 89, 6671-6688, 1984'
END_GROUP
GROUP = SUMMARY
"THIS DATA SET CONTAINS DESCRIPTIONS OF CLOUDS FOUND IN THE MARINER 9 AND
VIKING ORBITER IMAGES IDENTIFIED IN THE MARS_CLD_IMG DATASET. CLOUD
OCCURRENCES WERE COMPILED BY EXAMINING IMAGES FOR SPECIFIC CLOUD MORPHOLOGIES,
EXAMINING THE SAME AREA AT DIFFERENT TIMES, UTILIZING LIMB IMAGES AND
CONSULTING PHOTOMOSAICS TO DETERMINE THE SPATIAL RELATIONS OF CLOUD
OBSCURATIONS.  USERS SHOULD NOTE THAT APPROXIMATELY 7 PERCENT OF THE CATALOGED
```

```
EVENTS ARE AMBIGUOUS (3 TEAMS OF OBSERVERS WERE USED TO COMPILE THE CATALOG),
AND THAT ERRORS EXIST IN THE IDENTIFICATION OF CLOUD STREETS AT HIGH NORTHERN
LATITUDES (THE SIMILAR APPEARANCES OF CLOUD STREETS AND FIELDS OF SAND DUNES
MADE IDENTIFICATION DIFFICULT)."
END_GROUP
```

6. The following is the second directory entry for the PDS data set.

```
ENTRY_ID                      = MARS_CLD_CAT_2
ENTRY_TITLE                   = "MARS CLOUD CATALOG"
START_DATE                    = 1976-06-01
STOP_DATE                     = 1979-02-28
SENSOR_NAME                   = VISA>VISUAL IMAGING SUBSYSTEM CAMERA A
SENSOR_NAME                   = VISB>VISUAL IMAGING SUBSYSTEM CAMERA B
SOURCE_NAME                   = VO1>VIKING ORBITER 1
SOURCE_NAME                   = VO2>VIKING ORBITER 2
GROUP = INVESTIGATOR
  LAST_NAME                   = KAHN
  FIRST_NAME                  = RALPH
END_GROUP
GROUP = TECHNICAL_CONTACT
  LAST_NAME                   = KAHN
  FIRST_NAME                  = RALPH
END_GROUP
GROUP = DATA_CENTER
  DATA_CENTER_NAME            = PDS>PLANETARY DATA SYSTEM
  DATASET_ID                  = MARS_CLD_CAT
  GROUP = DATA_CENTER_CONTACT
     LAST_NAME                = LEE
     FIRST_NAME               = STEVEN
  END_GROUP
END_GROUP
STORAGE_MEDIUM                = 1 MAGNETIC_TAPE
PARAMETER                     = ATMOSPHERIC COMPOSITION > CLOUD > CLOUD_TYPE
PARAMETER                     = ATMOSPHERIC DYNAMICS > WIND > WIND_DIRECTION
PARAMETER                     = "ATMOSPHERIC COMPOSITION > AIR QUALITY >
                                HAZE_OPACITY"
PARAMETER                     = "ATMOSPHERIC COMPOSITION > AIR QUALITY >
                                HAZE_QUALITY"
DISCIPLINE                    = PLANETARY SCIENCE > PLANETARY ATMOSPHERES
LOCATION                      = MARS
KEYWORD                       = LIMB_POSITION
KEYWORD                       = ATMOSPHERES
KEYWORD                       = CLOUDS
KEYWORD                       = WIND
KEYWORD                       = MARTIAN METEOROLOGY
REVISION_DATE                 = 1987-01-31
SCIENCE_REVIEW_DATE           = 1984-01-01
GROUP = REFERENCE
'KAHN, JGR 89, 6671-6688, 1984'
END_GROUP
GROUP = SUMMARY
"THIS DATA SET CONTAINS DESCRIPTIONS OF CLOUDS FOUND IN THE MARINER 9 AND
VIKING ORBITER IMAGES IDENTIFIED IN THE MARS_CLD_IMG DATASET. CLOUD
OCCURRENCES WERE COMPILED BY EXAMINING IMAGES FOR SPECIFIC CLOUD MORPHOLOGIES,
EXAMINING THE SAME AREA AT DIFFERENT TIMES, UTILIZING LIMB IMAGES AND
CONSULTING PHOTOMOSAICS TO DETERMINE THE SPATIAL RELATIONS OF CLOUD
OBSCURATIONS.  USERS SHOULD NOTE THAT APPROXIMATELY 7 PERCENT OF THE CATALOGED
EVENTS ARE AMBIGUOUS (3 TEAMS OF OBSERVERS WERE USED TO COMPILE THE CATALOG),
AND THAT ERRORS EXIST IN THE IDENTIFICATION OF CLOUD STREETS AT HIGH NORTHERN
LATITUDES (THE SIMILAR APPEARANCES OF CLOUD STREETS AND FIELDS OF SAND DUNES
MADE IDENTIFICATION DIFFICULT).
END_GROUP
```

7. The following is an example from the Fields and Particles node of PDS.

```
Entry_ID:  J-PLS-5-ELE-MOM
Entry_Title:  "VOYAGER 1 JUPITER PLASMA DERIVED ELECTRON MOMENTS 96.0 C"
Start_date:  1979-03-01T12:27:43.435
Stop_date:  1979-03-07T11:59:03.738
Sensor_name:  PLS>PLASMA
Source_name:  VG1>VOYAGER 1
Group:  Investigator
     Last_name:  BELCHER
     First_name:  JOHN
     Middle_name:  B.
     Email:  SPAN>MITCCD::"JWB@SPACE"
     Phone: (617) 253-4285
     Group:  Address
       MIT 37-695
       CAMBRIDGE, MA  02139
     End_group
     End_group
GROUP:  Technical_contact
     Last_name:  RICHARDSON
     First_name:  JOHN
     Middle_name:  D.
     Email:  SPAN>MITCCD::"JDR@SPACE"
     Email:  TELEMAIL>[JOHN.RICHARDSON/NASA] NASAMAIL
     Phone:  (617) 253-6112
     Group:  Address
       MIT 37-655
       CAMBRIDGE, MA  02139
     End_group
End_group
GROUP:  Author
     Last_name:  PAULARENA
     First_name:  KAROLEN
     Middle_name:  I.
     Email:  SPAN>JPLPDS::KPAULARENA
     Email:  TELEMAIL>[KPAULARENA/NASA] NASAMAIL
     Phone:  (818) 354-1468
     Group:  Address
       MS 301-320
       JET PROPULSION LABORATORY
       4800 OAK GROVE DRIVE
       PASADENA, CA  91109
     End_group
   End_group
Group:  Data_Center
   Data_Center_Name:  PDS>PLANETARY DATA SYSTEM
   Dataset_ID:  VG1-J-PLS-5-ELE-MOM-96.0SEC
   Group:  Data_Center_Contact
     Last_name:  RICHARDSON
     First_name:  JOHN
     Middle_name:  D.
     Email:  SPAN>MITCCD::"JDR@SPACE"
     Email:  TELEMAIL>[JOHN.RICHARDSON/NASA] NASAMAIL
     Phone:  (617) 253-6112
     Group:  Address
       MIT 37-655
```

```
        CAMBRIDGE, MA  02139
      End_group
    End_group
End_group
Originating_center:  PDS
Storage_medium: 202667 BYTES ONLINE DISK
Parameter:  CHARGED PARTICLES > DENSITY > ELECTRON DENSITY
Parameter:  CHARGED PARTICLES > TEMPERATURE > ELECTRON TEMPERATURE
Discipline:  PLANETARY SCIENCE > FIELDS AND PARTICLES
Discipline:  SPACE PHYSICS > MAGNETOSPHERIC SCIENCE
Location:  JUPITER
Location: MAGNETOSPHERE
Keyword: ION DENSITY
Keyword: PLASMA
Revision_date: 1988-02-12
Science_review_date: 1988-01-12
Group:  Reference
```

BRIDGE, H.S., J.W. BELCHER, R.J. BUTLER, A.J. LAZARUS, A.M. MAVRETIC, J.D. SULLIVAN, G.L. SISCOE, AND V.M. VASYLIUNAS, THE PLASMA EXPERIMENT ON THE 1977 VOYAGER MISSION, SPACE SCI. REV., 21, 25, 1977.

SCUDDER, J.D., E.C. SITTLER, JR., AND H.S. BRIDGE, A SURVEY OF THE PLASMA ELECTRON ENVIRONMENT OF JUPITER: A VIEW FROM JUPITER, J. GEOPHYS. RES., 86, 8157, 1981.

SITTLER, E.C., JR., AND D.F. STROBEL, IO PLASMA TORUS ELECTRONS: VOYAGER 1, J. GEOPHYS. RES., 92, 5741, 1987.

End_group
Group:  Summary

Data Set Description

This data set contains the best estimates for the electron moment density and temperature. Adjacent low and high energy electron measurements are combined to form a composite spectra which is used for the moment calculation. The moment calculations generally are performed as described in Scudder et al. (JGR, 86, 8157, 1981) except on day 64. On day 64 the PLS ion densities were used to constrain the electron densities from 0415-1400 and from 1830-1940, and PRA densities were used to constrain electron densities from 1400 to 1830. These constraints and analysis are described in Sittler and Strobel (JGR, 92, 5741, 1987).

Instrument Description

The Voyager plasma science experiment consists of four modulated grid Faraday cups, three (A, B, C) of which are positioned about the main antenna axis and generally point toward the Earth with the fourth (D) at a right angle to this direction. Ion currents are sampled simultaneously in all four cups, electrons in the D-cup only. The instrument has an energy range of 10-5950 eV. Data is taken in four modes: high and low resolution ion modes, and high and low energy electron modes.
End_group

8. The following is an example from NASA Ocean Data System (NODS) that contains a number of key references considered to be important for evaluating the directory entry.

```
Entry_ID:                SSGDRSAG
Entry_Title:             "SEASAT SASS Backscatter Coefficient, Wind Speed and
                         Wind
                         Direction Level 2.0 "
Sensor_Name:            SASS>SEASAT-A Scatterometer System
Source_Name:            SEASAT
Start_Date:             1978-07-07
Stop_Date:              1978-10-10
Group:    Investigator
   Last_Name:           Freilich
   First_Name:          Michael
   Email:               Telemail>[M.FREILICH/OMNET]MAIL
   Group:   Address
          Ms 169-236
          Jet Propulsion Laboratory
          4800 Oak Grove Drive
          Pasadena, CA 91109
          USA
   End_Group
End_Group
Group:   Technical_Contact
   Last_Name:              Hilland
   First_Name:             Jeff
   Email:                  SPAN>STANS::JEH
   Email:                  Telemail>[JHILLAND/NASA]NASAMAIL
   Group:   Address
             MS T-1206-D
            Jet Propulsion Laboratory
            4800 Oak Grove Drive
            Pasadena, CA 91109
            USA
   End_Group
End_Group
Group:  Author
   Last_Name:    Smith
   First_Name:   Elizabeth
   Middle_Name:  A.
   Phone:  818-354-6980
End_Group
Originating_Center:        NODS
Group:    Data_Center
   Data_Center_Name:       NODS>NASA Ocean Data System
   Dataset_ID:             SSGDRSAG
  Group:   Data_Center_Contact
    Last_Name:             Lassanyi
    First_Name:            Ruby
    Email:                 SPAN>STANS::DATASPEC
    Group:  Address
              MS 202-101
             Jet Propulsion Laboratory
             4800 Oak Grove Drive
             Pasadena, CA 91109
             USA
    End_Group
```

```
   End_Group
  End_Group
 Group:  Data_Center
    Data_Center_Name:  NOAA/NESDIS/NCDC
    Group:  Data_Center_Contact
      Phone:  (301)763-8111
       Group:   Address
                Satellite Data Services Division
                World Weather Building Room 100
                Washington, D.C. 20233
      End_Group
    End_Group
 End_Group
  Storage_Medium:       548 magnetic tapes 1600 bpi
  Location:             Global
 GROUP:  Coverage
  Southernmost_Latitude:    -79
  Northernmost_Latitude:    +79
  Westernmost_Longitude:    0
  Easternmost_Longitude:    360
 End_Group
 Discipline:            Earth Science>Ocean
 Discipline:            Earth Science>Atmosphere
  Parameter:            Ocean Dynamics>Winds>Wind Speed
  Parameter:            Ocean Dynamics>Winds>Wind Direction
  Parameter:            Atmospheric Dynamics>Winds>Wind Speed
  Parameter:            Atmospheric Dynamics>Winds>Wind Direction
  Keyword:              Backscatter Coefficient
  Keyword:              Physical Oceanography
  Keyword:              Air-Sea Interaction
  Keyword:              Wind Speed
  Keyword:              Wind Stress
  Keyword:              Wind Direction
  Revision_Date:        1987-10-22
  Science_Review_Date:  1987-10-22
 Group:  Reference
```

Boggs, D. H. and G. H. Born, Seasat Geophysical Data Record (GDR) Users Handboook: Scatterometer. NASA, Jet Propulsion Laboratory, California Inst. of Technology, Pasadena, CA [JPL-622-232], [JPL-D-129] (Internal Document) August 1982, 267 pages.

Kirwan, A. D., T. J. Ahrens, and G. H. Born, eds., "SEASAT Special Issue II: Scientific Results," JGR, 88(c3), February, 1983.

Weissman, D. E., ed., "Special Issue on the SEASAT-1 Sensors," IEEE J. Oceanic Engineering, OE-5(2), April 1980.

End_Group
Group: Summary

SEASAT was launched on June 28, 1978, carrying a five sensor payload, and operated successfully until a power failure brought transmission to a stop on October 10, 1978. Its height and inclination were 791 km and 108.0 deg., respectively.

The microwave scatterometer (SASS) on the SEASAT-A satellite had the goal of determining the surface vector wind stress over the oceans and the neutral stability wind vector at a 19.5 m reference height. The physical basis for the measurement technique is the Bragg scattering of microwaves from centimeter length capillary ocean waves created by the surface wind. The strength of the radar backscatter is proportional to the capillary wave amplitude, which is in equilibrium with the wind friction speed. SASS cut two 500 km swaths 400 km apart along the ground track on either side of nadir. In addition, there was a central swath 140 km wide, centering on nadir. SASS had a 50 km resolution cell and 100 km spacing between cells. The FOV was +/- 0.25 degrees "cross cone." Pulse duration was 4.8 milliseconds, and the data stream was updated every 1.89 seconds.

Global coverage was achieved within the extremes +/-79 deg. latitude. From July 7 - August 17, 1978, the ground track equatorial spacing was 165 km. From August 18 - October 10, 1978 (the date that SEASAT terminally malfunctioned), the ground track equatorial spacing was 900 km. From July 7 to August 26, 1978, the ground track was repeated every 17 days. From August 27 to October 10, 1978, the ground track repeated once every 3 days.

This data set contains Level 2.0 backscatter coefficient corrected for atmospheric and oceanic attenuation. It also contains windspeed and 4 possible directions ("ambiguities") derived from the backscatter coefficient. Output is Geophysical Data Record (GDR) magnetic tapes, with a measurement temporal resolution of 1.89 seconds.

For wind speed of 4-26 m/s, the error was +/- 2 m/s or 10%, whichever was greater. For winds above 20 m/s in non-heavy rain areas, the mean error was +/- 2.4 m/s. The mean error for wind direction was +/- 20 degrees.
Related Data Sets: SEASAT SASS (Levels 1,1.5 and 2.5)
Altimeter (Levels 1, 1.5, 2 and 2.5)
SMMR (Levels 1, 1.5, 2 and 2.5) and
SAR (Levels 1 and 1.5)
Robert Atlas Dealiased SASS winds (Level 2.5)
Data Set Status: COMPLETE
Level 2.0 tapes are maintained by NODS and can be ordered via the NODS on-line inventory system for the entire 96 day SEASAT mission. These data reside on 548 (1600 bpi) magnetic tapes.
End_Group

# Appendix C

# Discipline Keywords

## Purpose

This appendix defines the list of currently allowable discipline keywords that should be used when submitting DIF files. The keywords are hierarchical with the first level of the hierarchy underlined and the second level listed in indented form under the first level.

# Discipline Keywords

Astronomy

Cosmic Ray Astronomy
Gamma Ray Astronomy
Infrared Astronomy
Microwave Astronomy
Radio Astronomy
Ultraviolet Astronomy
Visible Astronomy
X-Ray Astronomy

Earth Science

Atmosphere
Interior and Crust
Land
Ocean

Planetary Science

Fields and Particles
Atmospheres
Geosciences
Small Bodies
Rings

Solar Physics

Gamma-Ray Observations
Infrared Observations
Microwave Observations
Radio Observations
Ultraviolet Observations
Visible Observations
X-Ray Observations

Space Physics

Interplanetary Studies
Ionospheric Science
Magnetospheric Science

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# Appendix D

# Location Keywords

## Purpose

This appendix defines the list of currently allowable location keywords that should be used when submitting DIF files. The valid location keywords are listed twice, first grouped according to science disciplines and then in alphabetical order.

# Location Keywords (by discipline)

## Astronomy

Clusters of Galaxies
Extended Objects (Astronomy)
Galaxies
Interstellar Medium
Local Group of Galaxies
Milky Way Galaxy
Novae
Quasars
Radio Sources
Star Clusters
Stars
Supernova Remnants
Supernovae

## Earth Science

Africa
Antarctica
Arctic Ocean
Asia
Atlantic Ocean
Australia
Boundary Layer
Core
Crust
Equatorial
Europe
Global
Indian Ocean
Ionosphere
Mantle
Mediterranean Sea
Mesosphere
Mid-Latitude
North America
Pacific Ocean
Polar
Sea Floor
Sea Surface
South America
Southern Ocean
Stratosphere
Troposphere

## Planetary Science

Asteroids
Comets
Jupiter
Mars
Mercury
Meteoroids
Moon (Earth)
Moons (other)
Neptune
Pluto
Rings (planetary)
Saturn
Uranus
Venus

## Space Physics

High Latitude Magnetosphere
Inner Magnetosphere
Interplanetary (deep space)
Interplanetary (near Earth)
Ionosphere
Magnetosphere (other)
Magnetotail

## Solar Physics

Chromosphere
Corona
Photosphere
Solar Interior

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# Location Keywords (in alphabetical order)

Africa
Antarctica
Arctic Ocean
Asia
Asteroids
Atlantic Ocean
Australia
Boundary Layer
Chromosphere
Clusters of Galaxies
Comets
Core
Corona
Crust
Equatorial
Europe
Extended Objects (Astronomy)
Galaxies
Global
High Latitude Magnetosphere
Indian Ocean
Inner Magnetosphere
Interplanetary (deep space)
Interplanetary (near Earth)
Interstellar Medium
Ionosphere
Jupiter
Local Group of Galaxies
Magnetosphere (other)
Magnetotail
Mantle
Mars
Mediterranean Sea
Mercury
Mesosphere
Meteoroids
Mid-Latitude
Milky Way Galaxy
Moon (Earth)
Moons (other)
Neptune
North America
Novae
Pacific Ocean
Photosphere
Pluto
Polar
Quasars
Radio Sources
Rings (planetary)
Saturn
Sea Floor
Sea Surface
Solar Interior
South America
Southern Ocean
Star Clusters
Stars
Stratosphere
Supernova Remnants
Supernovae
Troposphere
Uranus
Venus

# Appendix E

# Parameter Keywords

## Purpose

This appendix defines the list of currently allowable parameter keywords that should be used when submitting DIF directory entries. The list is hierarchical with the first level of the hierarchy (presented in all capital letters) providing the parameter grouping. The second level of the hierarchy provides a general term for the parameter being measured.

# Parameter Keywords

## RADIANCE AND IMAGERY

- Gamma Ray
- Infrared
- Microwave
- Radio Wave
- Ultraviolet
- Visible
- X-ray

## MAGNETIC AND ELECTRIC FIELDS

- Activity Indices
- Electric Fields (DC)
- Electric Wave Spectra (AC)
- Magnetic Fields (DC)
- Magnetic Wave Spectra (AC)

## CHARGED PARTICLES

- Alpha Particles
- Composition
- Density
- Differential Flux
- Distribution Functions
- Electron Flux
- Energetic Particles
- Heavy Ions
- Proton Flux
- Speed
- Temperature

## NEUTRAL PARTICLES

- Composition
- Density
- Distribution Functions
- Flux
- Speed
- Temperature

## SOLAR PROPERTIES

- Active Regions
- Coronal Holes
- Events
- Filaments
- Flares
- Imagery
- Prominences
- Sunspots
- Synoptic Maps
- Velocity Fields

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## ASTRONOMICAL PARAMETERS

Abundances
Bibliography
Binaries
Colors
Cross Identifications
Ephemerides
Imagery
Magnetic Fields
Magnitudes
Masses
Models
Morphology
Object Counts
Occultations
Parallaxes
Photometry
Polarization
Positions
Proper Motions
Radial Velocities
Reddening
Redshifts
Rotational Velocities
Space Velocities
Spectra
Spectrophotometry
Variability

## ATMOSPHERIC COMPOSITION

Aerosols
Air Quality
Ash
Carbon Dioxide
Chlorofluorocarbons
Clouds
Contaminants
Humidity
Methane
Nitric Acid
Nitrogen
Nitrogen Dioxide
Oxygen
Ozone
Trace Elements
Trace Gases
Tracers
Water Vapor

## ATMOSPHERIC DYNAMICS

Altitude
Atmospheric Temperature
Cloud Types
Evaporation
Evapotranspiration
Geopotential Height
Heat Flux
Humidity
Paleoclimate Indices
Precipitation
Pressure
Solar Radiation
Storms
Visibility
Winds

## EARTH RADIATIVE PROCESSES

Albedo
Brightness Temperature
Heat Flux
Irradiance
Radiance
Solar Activity
Temperature
Thermal Inertia

## OCEAN COMPOSITION

- Alkalinity
- Aquatic Plants
- Biomass
- Carbon Dioxide
- Chemical Tracers
- Chlorophyll
- Conductivity
- Dissolved Solids
- Light Transmission
- Major Elements
- Minor Species
- Nitric Acid
- Nitrogen
- Nitrogen Dioxide
- Ocean Wildlife
- Organic Matter
- Oxygen
- pH
- Phosphates
- Phytoplankton
- Pigment Concentration
- Pollutants
- Salinity
- Sea Ice
- Sediments
- Silicate
- Suspended Solids
- Trace Elements
- Upwelling
- Zooplankton

## OCEAN DYNAMICS

- Bathymetry
- Brightness Temperature
- Currents
- Evaporation
- Geopotential Height
- Heat Flux
- Pressure
- Primary Production
- Sea Ice
- Sea Level
- Sea Surface Height
- Sedimentation
- Swell
- Temperature
- Tides
- Turbidity
- Upwelling
- Waves
- Winds

## HYDROLOGIC PARAMETERS

- Contamination
- Deposition
- Erosion
- Evaporation
- Glaciers
- Ground Water
- Infiltration
- Oxygen Demand
- Precipitation
- Rivers
- Runoff
- Sedimentation
- Solids
- Surface Water
- Temperature
- Turbidity
- Water Vapor
- Wetlands

## GEOLOGICAL PARAMETERS

Age Determinations
Coal
Economic Minerals
Geochemical Analysis
Igneous and Metamorphic Rocks
Lithology
Paleontology
Petroleum
Petrology
Sedimentary Rocks
Soils
Stratigraphy

## GEODYNAMIC FEATURES

Earthquakes
Erosion
Geodesy
Geothermal
Gravity Fields
Magnetic Fields
Polar Motion
Seismic
Structures
Terrain Elevation
Volcanoes

## GEOGRAPHY AND LAND COVER

Albedo
Elevation
Fires
Glaciers
Ice
Lakes
Landforms
Rivers
Snow
Soils
Surface Vegetation
Surface Water
Topographic Data
Wetlands

## BIOLOGICAL ENTITIES

Birds
Domesticated Animals
Domesticated Plants
Endangered Species
Land Wildlife
Microorganisms
Minor Species
Ocean Vegetation
Ocean Wildlife
Surface Vegetation

# Appendix F

# Glossary

## Purpose

This appendix defines acronyms and other important terms that are used in this manual and terms that may be used in writing DIF entries. The glossary section of this appendix contains the latest version of the Earth Science and Applications Data Systems (ESADS) lexicon.

# Glossary

## F.1 Acronyms

**ASCII:** American Standard Code for Information Interchange

**DIF:** Directory Interchange Format

**DPDC:** Data Processing and Distribution Center

**ESADS:** Earth Science and Applications Data Systems

**ISO:** International Organization for Standardization

**NASA:** National Aeronautics and Space Administration

**NCDS:** NASA Climate Data System

**NODS:** NASA Ocean Data System

**NSI:** NASA Science Internet

**NSN:** NASA Science Network

**NSSDC:** National Space Science Data Center (NASA)

**PCDS:** Pilot Climate Data System

**PDS:** Planetary Data System

**PLDS:** Pilot Land Data System

**SFDU:** Standard Formatted Data Unit

**SPAN:** Space Physics Analysis Network

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## F.2 Lexicon

# Interim ESADS Lexicon

## Sites and Facilities

(Note that a given organization may satisfy more than one of the definitions below; for example, many data centers are archives.)

**Active Data Base Site** - A site where data are being used actively in research and from which those data and resident expertise may be obtained.

**Data Archive** - A facility providing indefinitely long storage, preservation, disposition, and distribution of data sets and associated metadata.

**Data Center** - An institutionally supported facility providing convenient access to, manipulation of, and/or distribution of data sets (including supporting information and expertise) for a wide community of users. It has a long term charter (not tied to the lifetime of a specific project). A data center can create Special Data Products when needed.

**Data Processing and Distribution Center (DPDC)** - A facility that processes, maintains, and distributes data during the active phase of a spaceflight or other project.

**Institutional DPDC** - A DPDC supported by institutional resources and acting as a DPDC for a series of projects.

**Project DPDC** - A DPDC funded by and operated by (or for) a specific project.

# Interim ESADS Lexicon

## Data Types

**Ancillary Data** - Data other than instrument data needed for the processing and correct interpretation of the instrument's science data (e.g., spacecraft orbit/attitude, instrument pointing information, calibration data, meteorologic conditions).

**Correlative Data** - Data used to extract additional information from a given data set (e.g., two data sets may be correlative to each other).

**Data** - The representative forms of information, including facts, concepts, rules, or any other kind of knowledge.

**Instrument Data** - Data produced by the science and engineering sensors of an instrument.

**Instrument Engineering Data** - Data produced by an instrument's engineering sensor(s) (e.g., instrument temperature).

**Instrument Science Data** - Data produced by an instrument's science sensor(s) and containing the primary observables.

**Near Real-Time Data** - Data from the source that are available for use within a time that is short in comparison to important time scales in the phenomena being studied.

**Playback Data** - Data stored on a spacecraft, platform, or other carrier that are transmitted at a later time.

**Raw Data** - Numerical values representing the direct observations output by a measuring instrument in the order they were obtained after all effects of transmission have been removed.

**Quick-Look Data** - Data available for examination within a short time of receipt, where completeness of processing is sacrificed to achieve rapid availability.

**Real-Time Data** - Data received from the source with only propagation delays.

**Telemetry Data** - Electromagnetically transmitted data stream of measured values that may be in analog or digital format.

# Interim ESADS Lexicon

## Data Collection /Hardware

**Instrument** - An integrated collection of hardware containing one or more sensors and associated controls designed to produce data on an environment.

**Commercial Instrument** - An instrument developed and operated by a private organization whose data are sold commercially to the general user community.

**Operational Facility Instrument** - An instrument developed and operated by a national or international agency (e.g., NOAA, DOD) to support its operational requirements. Data from such an instrument may be made available to the research community.

**Principal Investigator Instrument** - An instrument developed and managed by a Principal Investigator (PI) selected through the NASA, or equivalent, Announcement of Opportunity (AO) process.

**Prototype Instrument** - An instrument primarily intended as a prototype for developing an operational instrument capability. The instrument may be replaced by an operational model or declared operational after the functional utility of the instrument is understood.

**Research Facility Instrument** - An instrument provided and managed by an institution for use by a group of approved investigators. Data from the instrument may be made available for the operational applications.

**Sensor** - A device that transmits an output signal in response to a physical input stimulus (as radiance, sound, etc.). Science and engineering sensors are distinguished according to the stimuli to which they respond.

# Interim ESADS Lexicon

## Data Aggregation

**Browse Data Set** - A data set, typically of limited size and resolution, created to rapidly provide an understanding of the type and quality of available full resolution data sets. It may also enable the selection of intervals for further processing or analysis of physical events. For example, a browse image might be a reduced resolution version of a single channel from a multi-channel instrument. *Note:* Full resolution data sets may be browsed, (see **Browse**, page F-13).

**Data Base** - (1) A collection of data sets with supporting metadata related to a system, project, or facility. (2) A collection of integrated data serviced by a Data Base Management System (DBMS), often organized for quick search and retrieval.

**Data Granule** - The smallest aggregation of data that is independently managed (i.e., described, inventoried, retrievable). Granules may be managed as logical granules and/or physical granules.

> **Logical Granule** - The smallest aggregation of data independently identified (i.e., described, inventoried).
>
> **Physical Granule** - The smallest aggregation of data independently accessible (i.e., located, readable, copyable) on physical media.

**Data Item(s)** - Value(s) of a measured or derived parameter, implicitly or explicitly accompanied by an identification of the points in independent variable space where the value(s) applies (e.g., x, y, z, t; a, b, c).

**Data Set (Dataset)** - A logically meaningful grouping or collection of similar or related data. Data having mostly similar characteristics (source or class of source, processing level and algorithms, resolution, etc.) but different independent variable ranges are normally considered part of a single data set.

**Data Product** - A uniformly processed and formatted data set, portion of a data set, or transformed representation of data (e.g., plot, photograph, digital image); may be produced by (or for) a project or by a data center.

**Standard Data Product** - (1) A data product, produced for a wide community, over most or all of the available independent variable space generated using fixed processing algorithms. (2) A data product produced to a format or on a medium that can be requested from a data center using its normal ordering procedure.

# Interim ESADS Lexicon

## Data Aggregation (*continued*)

**Special Data Product** - (1) A data product produced for specific use over a limited range of independent variable space or using non-standard processing algorithms. (2) A data product produced to a format or on a medium that a data center or DPDC produces under special arrangements (e.g., to user specifications).

## Interim ESADS Lexicon

Metadata

**Catalog Service** - A set of information, consisting of some or all of directory, catalog (guide), and inventories, combined with a mechanism to provide responses to queries, possibly including ordering data.

**Catalog System** - A specific implementation of a catalog service.

**Data Set Catalog** - A uniform set of detailed descriptions of a number of data sets and related entities, containing information suitable for making a determination of the nature of each data set and its potential usefulness for a specific application; also called a **Data Set Guide**.

**Data Set Directory** - A uniform set of descriptions of a large number of data sets containing information suitable for making an initial determination of the existence and nature of each data set. Each directory entry contains brief data set information (e.g., type of data, data set name, time and location bounds).

**Data Set Guide** - See **Data Set Catalog**.

**Data User Guide** - A document, either on line or hard copy, containing the necessary information for the correct usage of the data.

**Directory (General)** - A uniform set of descriptions of a class or classes of entities (e.g., data sets, data sources, Data Set Catalogs) with pointers to more details and to the entities themselves, as appropriate.

**Directory Service** - A directory, possibly supplemented with other kinds of information, combined with a mechanism to provide responses to queries.

**Directory System** - A specific implementation of a directory service.

**Inventory** - A uniform set of descriptions of granules from one or more data sets with information required to select and obtain a subset of those granules. Granule descriptions typically include temporal and spatial coverage, data quality indicators, and physical storage information. An inventory may describe physical granules, logical granules, or both, including a mapping between them if they are not identical.

**Inventory Service** - An inventory, possibly supplemented with other kinds of information, combined with a mechanism to provide responses to queries, possibly including ordering data.

# Interim ESADS Lexicon

## Metadata (*continued*)

**Inventory System** - A specific implementation of an inventory service.

**Metadata** - Information describing a data set, including data user guide, descriptions of the data set in directories, catalogs, and inventories, and any additional information required to define the relationships among these.

# Interim ESADS Lexicon

## Data Storage

**File** - (1) A set of one or more related physical records treated as a unit. For example, a file is the unit characterized in an operating system's directory for disk storage. (2) An unstructured stream of bytes of a specified length (in bytes), referenced by a name string.

**Logical Record** - A collection of data whose location and extent are defined in terms of the information they contain and not in terms related to the physical medium on which they are stored. Portions of the same logical record may be located in different physical records, or several logical records may be located in one physical record.

**Logical Volume** - That portion of a volume viewed by a computer operating system as a complete collection of available files. For instance, with today's WORM optical disk drives, each side of a two-sided disk is a logical volume.

**Physical Record** - A collection of data whose location and extent are defined in terms related to the physical medium on which it is stored. A physical record may contain one or several logical records or a part of a logical record.

**Volume** - A unit of physical media containing data, usually physically interchangeable with other volumes of a similar type, and requiring a specific device for reading or writing (e.g., a dismountable CD-ROM).

**Physical Medium** - Any physical material capable of holding data (e.g., pages, film, magnetic tape, optical disk, wire, silicon).

# Interim ESADS Lexicon

## Miscellaneous Terms

**Browse** - (1) To look over or through data or some representation of data in search of something of interest. (2) To view data, metadata, or browse data sets to determine the usefulness of the data to some application.

**Discipline** - A field of study (e.g., oceanography, meteorology, geology, land biology).

**Data Rights** - An agreement between the funding agent, the project, and the investigation team whereby the team is accorded exclusive use of data for a limited period of time.

**Data System** - An integrated system containing data catalog(s) and inventories as well as data storage, access, manipulation, retrieval, and display capabilities.

**Parameter** - A measurable or derived variable.

**Principal Investigator (PI)** - The individual selected by proposal review with primary responsibility for preparing the proposal, selecting the investigation team, carrying out the investigation, and reporting the results. Responsibilities often include supplying an instrument.

**Co-Investigator** - An individual selected by the Principal Investigator who typically provides support in preparing the proposal and who has specific responsibilities in the development, operations, or analysis phases of the investigation.

**Guest Investigator** - An individual who receives data rights to the project data based on approval of a research proposal.

**Interdisciplinary Scientist** - An individual selected by the project and/or the peer review process who is responsible for conducting investigations requiring analysis, interpretation, and use of data crossing instrument and discipline boundaries.

**Participating Scientist** - An individual selected by the funding agency who joins the investigation during the data acquisition and analysis phase.

# Appendix G

# SFDU Headers on DIF Files

## Purpose

This appendix defines the Standard Formatted Data Unit (SFDU) header, which may be placed in front of the DIF file to identify it as a standard registered format for the transfer of information.

# SFDU Headers on DIF Files

The SFDU header is a fixed ASCII character string that may be added to the front of a DIF file as an added form of documentation. It is recognizable to the international community as an indicator that the file is written according to a standard registered format obtainable from the SFDU control office that issued the registration number. In this case the DIF file as defined by this manual has been registered at the SFDU control office in the National Space Science Data Center at Goddard Space Flight Center.

This appendix will not describe all of the elements of the SFDU header. The definition of these headers may be found through literature available through any of the SFDU control offices.

In general, the ASCII character string elements that make up the header are as follows (note that `cf` represents the combination of the carriage return and line feed characters and no other carriage returns or line feeds should be assumed):

| | |
|---|---|
| `CCSD1Z000001` | This part indicates this package is an SFDU. |
| `00000069` | This is the number of bytes that follow in the HEADER. |
| `CCSD1R000003` | This part identifies a subheader that defines conventions used in the body of the package. |
| `00000049` | This is the number of bytes for the remainder of the subheader. |
| `DELIMITER=EOFcf` | This determines how the package ends. |
| `PROTOCOL=NONEcf` | This determines the protocol. |
| `TYPE=NSSD1I000003cf` | This defines the following part of the package as standard format #3 registered at the NSSDC Control Office. |

Putting all of this together as an ASCII character string attached to the front of a DIF file, the following would be seen at the receiving end.

```
CCSD1Z00000100000069CCSD1R00000300000049DELIMITER=EOF
PROTOCOL=NONE
TYPE=NSSD1I000003
Entry_ID:  Sample_DIF_1
...

Here are the other DIF fields...
...
```

In this case the line feed and carriage returns are indicated only by the start of a new line. The end of the package is the standard ending character added automatically by computers as the end of the file.

In summary, the character string to be added to the front of a DIF file to identify it as an SFDU standard is

```
CCSD1Z00000100000069CCSD1R00000300000049DELIMITER=EOF
```

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```
PROTOCOL=NONE
TYPE=NSSD1I000003
```

where carriage returns and line feeds occur at the ends of each of the lines (these are usually inserted automatically when the carriage return is pushed).