
EUV IMAGING SPECTROMETER

Hinode

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EIS data files and directory structure

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1 Overview

This document describes the filename formats for EIS data, and gives a recommendation about how the files should be stored on a user's computer.

Note that members of the EIS PI team institutes probably have access to the complete set of level-0 data at these institutes, and so these users should take care in attempting to 'ingest' data (Sect. 5.2).

2 Types of EIS file

EIS filenames have the form

```
eis_TT_YYYYMMDD_HHMMSS.fits
```

TT gives the type of the file: 'l0' for level-0, 'l1' for level-1, and 'er' for level-1 error file. YYYYMMDD gives the year-month-day, e.g., '20101020' for 20-Oct-2010. HHMMSS gives the start time (UT) of the observation, e.g., '082654' for 08:26:54. Users are strongly recommended *not* to rename the EIS files, however users are recommended to compress the files with, e.g., gzip.

Usually within a day-or-so of the observations the EIS data will be written to a *quicklook* file. These files may not contain all of the data and may contain incorrect information in the headers, thus they should not be used for data analysis. The file type is the same as level-0 files, i.e., 'l0', but they are stored in a different directory (see the following section). *Quicklook files are generally only available to the EIS team.*

Usually within a few days of the observation a level-0 file will be generated. This should be the definitive level-0 file, although sometimes level-0 files are re-formatted at a later date when extra data are recovered from the telemetry stream.

The level-1 file contains calibrated intensities and, unlike the level-0 file, it is generated by the user with the Solarsoft IDL routine EIS_PREP. When EIS_PREP is run with the keyword /SAVE it creates two files with types 'l1' and 'er'. The former is the level-1 file while the latter is almost identical except that the calibrated intensity arrays are replaced with arrays containing the error on the intensity.

Note that the various Hinode data archives distribute *only* level-0 files. Users are expected to generate the level-1 files at their own institute using EIS_PREP.

3 Directory structure

The recommended directory structure for storing EIS level-0 files is as follows:

```
/hinode  
  /sot  
  /xrt
```

```

/eis
  /level0
    /2010
      /01
      /02
        /01
        /02
  /level1
    /2010
      /01
      /02
        /01
        /02

```

where level-0 files for 1-Feb-2010 will be stored in the `/hinode/eis/level0/2010/02/01` directory.

The IDL routine `eis_ingest.pro` will automatically move a file or set of files into this directory structure (Sect. 5.2), but the user must first set up the correct environment variables for pointing to the location of the data. See the next section.

4 Environment variables

Users should define a top level environment variable called ‘`HINODE_DATA`’ to point to the location of Hinode data on their computer. This definition should be stored in either the user’s `.cshrc` (or equivalent) file, or the IDL startup file. The examples below assume it is defined in the IDL startup file.

```
setenv, 'HINODE_DATA=/user/home/data/hinode'
```

With this environment variable set, the EIS software will automatically check for level-0 and level-1 files in the directories:

```
$HINODE_DATA/eis/level0
$HINODE_DATA/eis/level1
```

These default locations for the level-0 and level-1 files can be over-ridden with the environment variables `$EIS_L0_DATA` and `$EIS_L1_DATA`. For example:

```
setenv, 'EIS_L0_DATA /user/home/eis_10'
setenv, 'EIS_L1_DATA /user/home/eis_11'
```

The `$EIS_L1_DATA` variable is useful if your institution stores level-0 data in an institution-wide directory to which you do not have write access to. The `$HINODE_DATA` variable would point to this directory, and `$EIS_L1_DATA` can be used to point to a directory on the user’s computer that he/she does have write access to..

An additional variable, `$EIS_QL_DATA` is available for the location of quicklook data.

5 How to organize your EIS data

5.1 Hinode Science Data Centre Europe

If you use this service (<http://sdc.uio.no>), then when you select your data-sets and click the ‘Retrieve’ button you will be provided with a tar or zip file containing the data files. This file should be downloaded to your `$HINODE_DATA` directory, and unpacked there. The files will unpack into the correct EIS directory structure as described in Sect. 3.

5.2 The `eis_ingest` routine

If you have a list of files in a directory, then they can be moved into the EIS data directory tree by doing

```
IDL> filelist=file_search('*.fits*')
IDL> eis_ingest, filelist
```

The files will automatically be moved into appropriate level-0 or level-1 directory. Quicklook files are not supported, however.

Note that files will not be moved if files of the same name (whether compressed or uncompressed) already exist in the destination directory.

6 Finding files

With the EIS files correctly sorted into the directory structure given in Sect. 3, then the user can search for a file as follows. For example,

```
IDL> file=eis_find_file('5-jan-2010 05:00')
```

which will search for the nearest EIS level-0 file to the specified time. The keyword `/LEVEL1` allows the search to be performed on level-1 files. A complete list of files for the specified day can be obtained by giving the `/ALL` keyword.

A useful option is `/sequence` which will return the names of all the files in the sequence. For example, if the file at 05:00 on 5-Jan-2010 belongs to a sequence of files running between 01:00 and 08:00, then all of these files will be returned. A sequence is a set of raster-repeats. An example for using this keyword is:

```
IDL> file=eis_find_file('20-jan-2007 22:00',/sequence)
IDL> eis_raster_browser, file
```

A Document modification history

Version 1.2: Added mention of the /sequence keyword in Sect. 6.

Version 1.1: Added warning in introduction for users at EIS PI institutes; Sect. 5.2 now states that files will not be moved if they already exist in destination directory.