

Manual for the GRIS archive

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History

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1 Directory and file structure

On KIS machines, the GRIS archive is mounted under `/archive/gris/` (web access see below). For the folders contained in `/archive/gris/`, two naming schemes are allowed (naming schemes are indicated by chevrons `<>` in this document):

1. the standard, one folder per day:

`<YYYYMMDD>`

2. several folders per day (e.g. if different PIs are observing in the morning/in the afternoon):

`<YYYYMMDD_1>`

`<YYYYMMDD_2>`

`<YYYYMMDD_3>`

...

In those folders, there are by default (up to) 4 subfolders:

`level0`

`level1`

`level2`

`context_data`

The naming scheme of GRIS fits files is the following:

`<DDmmmYY.NNN>` for single files or

`<DDmmmYY.NNN-NN>` for sequences

Example: `13may16.005` and `13may16.006-01`. This is for raw data. In addition to that, there are different file endings for reduced data, namely `c`, `m`, `cm`, `cc`, and `r`.

`level0` contains all raw data, i.e. all data files that do **not** have a file name ending in `c`, `m`, `cm`, `cc`, or `r`. In addition, the log file of that day (e.g. `13may16.log`) is located in this folder. This is **not** the observing log written by the observer!

`level1` contains the reduced spectroscopic/spectropolarimetric data. Depending on the type of data, the files in this folder are the following:

- spectropolarimetric data: all data files with a file name ending in `cc` and `cm`. `c` and `m` files should be deleted in this case, as they are only intermediate products.
- spectroscopic data: all data files with a file name ending in `r` and `m`. Unlike for spectropolarimetric data, the `m` files must be kept in this case.

`level2` contains IDL save files with additional information for sunspot data (ask Morten Franz for details).

`context_data` contains png and eps files. The png files show an overview of the scan and are automatically created by a script. The eps files show the scan overplotted onto an HMI/MDI image (not for all datasets) and are created manually with the *CASSDA GUI for TIP and GRIS*.

In addition to those 4 subfolders, there are 3 files in each archive folder:

<YYYYMMDD>.txt (e.g. 20160513.txt)
cal<DDmmmYY>.pro (e.g. cal13may16.pro)
calib.pro

<YYYYMMDD>.txt is the log file written by the observer. It should contain information about the observer(s), targets, files, observing conditions etc. A typical log file could look like this:

Observers: Morten Franz, Christoph Kuckein
Fe I 15650, co-observation with IRIS, GFPI in NaDII and BIC/HiFi
Cameras in Ca396 & gband430

UT 07:52 13may16.000
telescope calibration
3 ac - 100 ms (same settings as for science data)

UT 07:57 13may16.001
flat field
100 steps - 3 ac - 100 ms

UT 08:05 13may16.002
scan of main spot in AR 12335
200 steps, 3 ac, 100 ms, edge scan
Only one map because FOV is too small

UT 08:19 13may16.003
scan of main spot in AR 12335
100 steps, 3 ac, 100 ms, 3 repetitions, edge scan
08:29 UT stop at step 253 due to AO jump

UT 08:34 13may16.004
scan of main spot in AR 12335
100 steps, 3 ac, 100 ms, 3 repetitions, edge scan

UT 09:03 13may16.005
scan of penumbra of main spot in AR 12335
50 steps, 3 ac, 100 ms, 20 repetitions, edge scan
Seeing is bad at the beginning and improves during
the last part of IRIS co-observation (up to 09:45 UT)

UT 09:51 13may16.006
flat field
100 steps - 3 ac - 100 ms

UT 09:58 13may16.007
telescope calibration
3 ac - 100 ms

cal<DDmmmYY>.pro is a calibration file, i.e. an IDL routine which specifies the filenames for the data reduction code. After the installation of the de-rotator (2016 and later), a typical calibration file could look like this (note that the xtau values and other things are changing, so **If you copy&paste this, pay attention to the details!**):

```
pro cal13may16

lambda=15650.

;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

fileff=['13may16.001']
filecal=['13may16.000']
map='13may16.002'
gris_v5,map,fileff,filecal,lambda=lambda

;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

fileff=['13may16.001']
filecal=['13may16.000']
map='13may16.003'
gris_v5,map,fileff,filecal,lambda=lambda

;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

fileff=['13may16.006']
filecal=['13may16.007']
map='13may16.004'
gris_v5,map,fileff,filecal,lambda=lambda

;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

fileff=['13may16.006']
filecal=['13may16.007']
map='13may16.005'
gris_v5,map,fileff,filecal,lambda=lambda

;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;

return
end
```

Please make sure that the **first** line in each calibration file is `pro cal<DDmmmYYY>` (in the example above: `pro cal13may16`). Otherwise, it will not work properly for the archive.

calib.pro is exactly the same file as cal<DDmmmYY>.pro, just renamed to calib.pro (both the filename and at the beginning of the routine). This is necessary to be able to reduce larger time spans of data in one go in IDL.

2 The webpage for the GRIS archive

2.1 URL and layout

The URL for the GRIS archive webpage is

<http://archive.leibniz-kis.de/pub/gris/>

It should look vaguely like this:

Data archive for the GREGOR Infrared Spectrograph

2016

May: 09 13 14 15 18 19 20 21 22 23 26 27 29 30
June: 02 04 05 06 07 08 09 10 11 12 13 14 15 16 19 20 21 22 28
July: 02 03 19 27
August: 08 10 13 14 15 16 17 19 22 23 24 25 26 29 30
September: 02 21 22 23 24 26 28 29
November: 25 28

2015

April: 15 16 17 18 19 21 23 26 27 29 30
May: 01 02 07 08 09 10 11 18 19 21 22 23 24 25 28 29 30 31
June: 01 02 03
August: 04 06 19
September: 08 09 10 12 13 14 15 16 17 19 20

2014

April: 26 27 28 29 30
May: 01 02 03 05 07 08 09 10 11 12
June: 17 18 19 20 21 22 23 24 25 26 27 28 29
July: 01 02 03 05 08 09
September: 02 03 04 05 08 10 11 13 17 18 20 22 23

color coding: [1083 nm data](#) [1565 nm data](#) multiple and/or other wavelength regions within an observing day
format coding: at least one spectropolarimetric dataset or *spectroscopic data only*

The following links provide additional information on:
The [GRIS archive](#), the [1.5 \$\mu\text{m}\$ level2 data](#), the [GREGOR telescope](#), the [Adaptive Optics system](#) and the [GRIS instrument](#).
The spatial and spectral quality of the GRIS data was studied in detail by [Borrero et al. \(2016\)](#) and [Franz et al. \(2016\)](#).

For visualization and standard calibration of GRIS level1 data you may download an [IDL-GUI](#) which requires `sswidl` and runs as a virtual machine without a licence in IDL8.5 or higher. The installation procedure is described in the [manual](#).

If you make use of this archive please acknowledge the GRIS & GREGOR projects by citing the abovementioned [publications](#) and add this [paragraph](#) to the end of your manuscript.

For questions/comments/suggestions contact **Morten Franz**.

The two most observed wavelength regions are 1083 nm and 1565 nm, these are color-coded in red/blue. A normal font indicates that there is at least one spectropolarimetric dataset on that day. If there are only spectroscopic observations, the date will be printed in italics.

At the bottom of the webpage there are links to this manual and information about the level2 data available for some of the 1565 nm observation. These data contain calibration files, the corrected Stokes vectors and atmospheric parameters computed from spectral analysis. Additionally there are links to publication describing the GREGOR telescope and its instruments, as well as the quality of the GRIS data.

Furthermore, there is a downloadable version of the *CASSDA GUI for TIP and GRIS* and the corresponding manual. All the subroutines and auxiliary information for the *GUI* are archived into a single `.tar` file and should be kept within one directory after extraction. For full functionality the *GUI* requires a working SolarSoft installation (`/sswidl`) including the instrument packages `hmi` and `mdi`. As an alternative, there is a `CASSDA_GUI_TIP.sav` files that can be executed in a shell using the command `idl -vm="CASSDA_GUI_TIP.sav"`. This option works for IDL version 8.5, or higher, and runs the *GUI* with IDL virtual machine, which does not require a license. For more detailed information please consult manual of the *GUI*.

Finally, we ask you to acknowledge the GRIS & GREGOR projects. Please do so by citing the papers and by adding a paragraph at the end of your manuscript. There is a `LATEX.bib` file with all the relevant information for your bibliography and there is `LATEX.tex` file with an acknowledgement sentence which you can copy past to your manuscript.

For each day, there is an overview website for the datasets taken that day. If the observed targets are sunspots, pores, or anything with enough structure to cross-correlate the scan with HMI continuum images, there will also be an HMI full-disk image underneath each scan to indicate the position and direction of the scan. However, the HMI overview images will only exist if someone manually created them with the *CASSDA GUI for TIP and GRIS*, as there is no way to create those in an automated fashion.



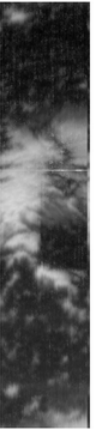

The overview webpages for each observing day will look something like this:

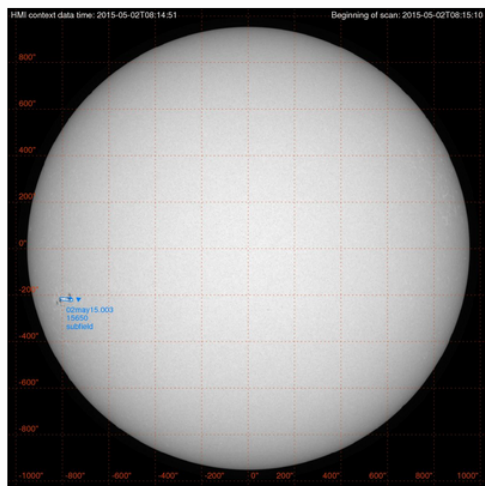
[Back to main page](#) [Go to archive folder](#)

HMI context data: The arrow in the box indicates the 'slit direction', the arrow outside the box the scanning direction.
Blue (red) color of the box indicates that the GRIS scan is flipped in the scanning direction with respect to HMI (or not).

Please note that the coordinates ('x/y-pos') given in the GRIS preview images are those from the fits headers, so they are not necessarily correct.

02may15.003

TOT I	TOT Q	TOT U	TOT V	
				02may15.003 1565 nm 08:15:10-08:18:56 UT 100.0 ms / 3 accum. # of steps: 103 x/y-pos: -741" / 126"



The link “Go to archive folder” points to the according subfolder in `/archive/gris/` where the science data can be downloaded directly in the browser (a more convenient option is to download the data with `wget`, see below). By now all data from the early-science-phase of GREGOR (2014-2016) is publicly available with the exception of some SOLARNET campaigns in 2015 and 2016. For these data only the overview images are publicly available, access to the science data is password protected, and only the PI of the campaign has access to it.

2.2 Downloading data with wget

Here are a few examples how to download data from the archive with `wget`. The examples are for the user “foo” with the password “bar”. To prevent that the password shows up in clear text in the bash history and in the `ps` and `top` commands, the `wget` command line option `--ask-password` is used and the user is prompted to type in the password. Alternatively, you can use the option `--password=bar` to pass the password directly – at your own risk.

- Download all reduced data from 2 May 2015 to the current folder:

```
wget -rnd --no-parent -A '02may15*' --user=foo --ask-password \  
http://archive.leibniz-kis.de/pub/gris/20150502/level11/
```

- Download all raw data from 2 May 2015 to the current folder:

```
wget -rnd --no-parent -A '02may15*' --reject="*.log" --user=foo \  
--ask-password http://archive.leibniz-kis.de/pub/gris/20150502/level10/
```

- Download the entire archive folder from 2 May 2015 to the folder 20150502 :

```
wget -rnH --no-parent --cut-dirs=2 --reject="index.html*" --user=foo \  
--ask-password http://archive.leibniz-kis.de/pub/gris/20150502/
```

- Download all archive folders from 17-20 June 2014 into according subfolders 20140617, 20140618 etc.:

Create a file with the folder names you want to download, e.g. `dl_list.txt` looking like this:

```
http://archive.leibniz-kis.de/pub/gris/20140617/  
http://archive.leibniz-kis.de/pub/gris/20140618/  
http://archive.leibniz-kis.de/pub/gris/20140619/  
http://archive.leibniz-kis.de/pub/gris/20140620/
```

Then call `wget` like this:

```
wget -rnH --no-parent --cut-dirs=2 --reject="index.html*" -i dl_list.txt \  
--user=foo --ask-password
```

3 A note to observers

In order to keep the archive up to date, running, and useful to all observers, I **strongly** advise to use the abovementioned directory/file structure already **while** observing. You will make the life of the archive administrator (and yours) much easier if you stick to this structure. In particular, please pay attention to the following things:

- Stick to the following file/directory structure:

– example for 3 May 2015 for spectropolarimetric data:

```
20150503/  
  level0/  
    03may15.log  
    03may15.000  
    03may15.001  
    03may15.002  
    03may15.003-01  
    03may15.003-02  
    ...  
  level1/  
    03may15.002cc  
    03may15.002cm  
    03may15.003-01cc  
    03may15.003-01cm  
    03may15.003-02cc  
    03may15.003-02cm  
    ...  
20150503.txt  
cal03may15.pro  
calib.pro
```

– example for 4 May 2015 for spectroscopic data:

```
20150504/  
  level0/  
    04may15.log  
    04may15.000  
    04may15.001  
    04may15.002  
    04may15.003-01  
    04may15.003-02  
    ...  
  level1/  
    04may15.002r  
    04may15.002m  
    04may15.003-01r  
    04may15.003-01m  
    04may15.003-02r  
    04may15.003-02m  
    ...  
20150504.txt  
cal04may15.pro  
calib.pro
```

- If there are different observing campaigns (i.e. different PIs) in the morning/afternoon of the same day, the top folder names should look like this in order to separate them (and the access in the archive):

```
20150503_1/  
20150503_2/
```

- Make sure that there is enough disk space available before you start observing! Otherwise, you will end up with the same filenames for different datasets.
- To make our lives easier, please delete files immediately that can not be used for further data processing. If, for example, data acquisition fails, the calibration unit does not move in properly, the M1 curtain closes during observation, etc., the respective files in `/gris_local/YYYYMMDD/` are useless.
- After a successful observing day, start the reduction on `ulises4`. To this end, update the `calDDmmYY.pro` file and execute it the `/gris_local/YYYYMMDD` directory using IDL.

- Please(!) do not scatter the data wherever disk space is available! The default is under `/instruments/gris/` on `hathi`. If you have a good(!) reason to put the data somewhere else, please notify the archive administrator. You can use `rsync` to copy the data: `rsync -r -t -v /gris_local/YYYYMMDD /gris_archive/`
- At the end of your campaign, notify the archive administrator (currently Morten Franz) about your data, as there is no automatic syncing of the data implemented yet.
- If you were not able to record any data (e.g. because of bad seeing or due to technical difficulties) delete the respective directories on `/gris_local/` before you leave the telescope and do not sync them to `/gris_archive/`.
- Data processing is easier if the number of scan steps is a multiple of 100. If you want to use fraction of 100, use something like 10, 20, 50 or 150. Try not to use odd numbers like 37 or 113.
- For the observers' logfile, please stick to the conventions from earlier logfiles and use common sense. A logfile should obey the naming scheme `<YYYYMMDD.txt>` and contain at least the following information (see the example on page 4):
 - the observed wavelength
 - the PI of the campaign/the observers present
 - which file is what? (flat fields, telescope calibration, targets, science data etc.)
 - information about targets and co-observations with other instruments
 - observing conditions/possible issues with the instrument
- For the calibration file (see page 5), please make sure that:
 - the filename is `cal<DDmmmYY>.pro` → e.g. `cal13may16.pro`
 - the first line of the calibration file is `pro cal<DDmmmYY>` → e.g. `pro cal13may16`
 - the calibration file does not contain the data reduction for targets
 - all datasets of the day will be reduced, i.e. make sure that nothing is commented out
 - there is a copy of the calibration file named `calib.pro` and that the first line of this file is `pro calib`
 - if the calibration file is changing at some point after the campaign (for example if M. Collados introduced specific keywords in the reduction routines to take care of possible instrument issues), notify the archive administrator about it and attach the new calibration file
- It is helpful if you make a copy of the `calDDmmmYY.pro` file, but if you do so, please(!) name it `calib.pro` and replace `calDDmmmYY` by `calib` in the first line (see page 5).

Thanks and good luck!