# Effelsberg continuum data reduction pipeline (eff_cont.py)

**This page is under construction**

**Quickstart guide**

Working case:

On April 4, 2019 the telescope performed 93 measurements of (point) sources for the project with identifier (prj-id) "73-18" using the cross-scan method. The raw data are stored in the folder /daten/mbfits/

To recover the calibrated flux densities, corrected for well-known effects, follow the steps below:

1. Identify a directory to store the reduced data (either use existing or create a new one). In the following, this will be referred to as the **_parent_** directory. For this example the parent directory will be called 20190404_73-18.
2. Access the parent directory, e.g. `cd 20190404_73-18`
3. Run the reduction pipeline software with the correct options

```
/opt(/effsoft)/ContPipeline/eff_cont.py --prj-id 73-18 --date 2019-04-04
```

To see all options with a brief description call

```
/opt(/effsoft)/ContPipeline/eff_cont.py -h
```

**Arguments and their options:**

1. "`–scan [opt]`" or "`-s [opt]`", where `[opt]` can be:

- scan number: the program will process only the measurement with the selected scan number
- scan range in the form 'min-max': the program will process all measurements with scan number within the specified range
- the word '`scans`': the program will search the local directory for an ascii file named '`scans`' that contains the list of scans to be processed in the form. For example, if you want to process only the scans with numbers 4056, 4057, 4068 and 4069 the file '`scans`' should look like this:

```
4056
4057
4068
4069
```

If the argument "`–scan [opt]`" is not specified, the program will process all scans in the raw data directory (`/daten/mbfits` or otherwise specified)

1. "`–fdir [path]`", where `[path]` the path (relative or absolute) to the raw data directory.

If the argument "—fdir [path]" is not specified, the program will search for data in the directory /daten/mbfits

1. "—prj-id [id1 id2 …]", where [id1 id2 …] is a list with project identifiers (either one or several). If the argument "—prj-id [id1 id2 …]" is not specified, the program will process all scans in the raw data directory (/daten/mbfits or otherwise specified)
2. "—date [YYYY-MM-DD]", where [YYYY-MM-DD] is the date of the scans to be processed, as stated in the example above. To extend the range of dates, you can also use wild cards (e.g. *), but in that case the date option should be called within quotes. For example, if you want to process all scans measured in April 2019, you should call:

```
/opt(/effsoft)/ContPipeline/eff_cont.py --date '2019-04-*'
```

You can use any combination of the above arguments. The program will search for the subset of scans that agree with all selections. For example, if you call

```
/opt(/effsoft)/ContPipeline/eff_cont.py --scan 3000-4000 --fdir
/another/raw/data/folder —prj-id 73-18 65-18 --date '2019-04-*'
```

the program will search for scans that:

- have scan numbers between 3000 and 4000
- their raw data are located in the directory /another/raw/data/folder
- were measured for the experiments with identifiers 73-18 and 65-18
- were obtained within April 2019

The search results will be printed on screen as follows:

```
List of scans to process:
date_____    scan  prj-id__   febe_____
2019-04-03   3000  73-18      S110mm-MULTICBE8k
2019-04-03   3001  73-18      S110mm-MULTICBE8k
2019-04-03   3002  73-18      S60mm-ICPBE
2019-04-03   3003  73-18      S60mm-ICPBE
.............................................
2019-04-04   3992  65-18      S60mm-ICPBE
2019-04-04   3993  65-18      S45mm-OPTOCBE
2019-04-04   3994  65-18      S45mm-OPTOCBE
2019-04-04   3995  65-18      S45mm-OPTOCBE
2019-04-04   3996  73-18      S36mm-ICPBE
2019-04-04   3997  73-18      S36mm-ICPBE
2019-04-04   3998  73-18      S36mm-ICPBE
2019-04-04   3999  73-18      S28mm-ICPBE
2019-04-04   4000  73-18      S28mm-ICPBE

93 files found, proceed? [y/n]: y
```

If the displayed information corresponds to the data you want to process, respond with 'y' and press return (enter) to start the processing. Otherwise respond with 'n' and press return (enter) to exit the program.

During the processing, several messages will be printed to show the progress and information of the procedure. In most cases, there is no need to interact with the program before the procedure is completed.

**tbc**

The script will do the following:

- Create the folder tree
- Gather data info in FLDR01
- Extract raw data in ASCII files in FLDR02
- Fit data in FLDR03
- Correct for pointing in FLDR04
- Correct for atmospheric opacity in FLDR05
- Correct for elevation-dependent gain in FLDR06
- Convert to physical units (Jy) in FLDR07
- Summarize results in FLDR08

The results contain:

- IQUV fluxes for each FEBE and baseband
- Calibration files (Jy/Tcal or Jy/K factors)

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