# Package 'SEF'

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**Type** Package

**Title** Tools to handle the C3S Station Exchange Format

**Version** 1.0.0

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**Description** Functions for writing and reading SEF files.

**Depends** R (>= 3.2.0)

**License** file LICENSE

**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 7.1.1

## R topics documented:



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`Bern` *Sub-daily meteorological observations for Bern*

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### Description

Observations of pressure and temperature for the city of Bern (Switzerland) for the period 1800-1827.

### Usage

```
Bern
```

### Format

A list of data frames (one data frame per variable). The format of the data frames is that required by the QC functions.

### Source

Institute of Geography - University of Bern

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## check_sef *Check compliance with SEF guidelines*

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### Description

Check compliance with SEF guidelines

### Usage

```
check_sef(file = file.choose())
```

### Arguments

| | |
|---|---|
| file | Character string giving the path of the SEF file. |

### Value

TRUE if no errors are found, FALSE otherwise.

### Note

For more information on error/warning messages produced by this function see the SEF documentation.

### Author(s)

Yuri Brugnara

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## Meta *Metadata for the station of Bern*

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### Description

Metadata for the station of Bern

### Usage

```
Meta
```

### Format

A list of data frames (one data frame per variable)

### Source

Institute of Geography - University of Bern

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`read_meta` *Read metadata from the Station Exchange Format version 1.0.0*

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### Description

Read metadata from the Station Exchange Format version 1.0.0

### Usage

```
read_meta(file = file.choose(), parameter = NULL)
```

### Arguments

| | |
|---|---|
| `file` | Character string giving the path of the data file. |
| `parameter` | Character vector of required parameters. Accepted values are `"version"`, `"id"`, `"name"`, `"lat"`, `"lon"`, `"alt"`, `"source"`, `"link"`, `"var"`, `"stat"`, `"units"`, `"meta"`. By default all parameters are read at once. |

### Value

A character vector with the required parameters.

### Author(s)

Yuri Brugnara

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`read_sef` *Read data files in Station Exchange Format version 1.0.0*

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### Description

Read data files in Station Exchange Format version 1.0.0

### Usage

```
read_sef(file = file.choose(), all = FALSE)
```

### Arguments

| | |
|---|---|
| `file` | Character string giving the path of the SEF file. |
| `all` | If FALSE (the default), omit the columns 'Period' and 'Meta' (also 'Hour' and 'Minute' for non-instantaneous data) |

### Value

A data frame with up to 9 variables, depending on whether `all` is set to TRUE. The variables are: variable code, year, month, day, hour, minute, value, period, metadata.

### Author(s)

Yuri Brugnara

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## Variables *List of standard variable codes*

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### Description

List of standard variable codes

### Usage

```
Variables
```

### Format

A data frame with two variables

### Source

C3S Data Rescue Service

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## write_sef *Write data in Station Exchange Format version 1.0.0*

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### Description

Write data in Station Exchange Format version 1.0.0

### Usage

```
write_sef(
  Data,
  outpath = getwd(),
  variable,
  cod,
  nam = "",
  lat = "",
  lon = "",
  alt = "",
  sou = "",
  link = "",
  units,
  stat,
  metaHead = "",
  meta = "",
  period = "",
  time_offset = 0,
  note = "",
  keep_na = FALSE,
  outfile = NA
)
```

## Arguments

| | |
|---|---|
| Data | A data frame with 6 variables in this order: year, month, day, hour, minute, value. |
| outpath | Character string giving the output path (note that the filename is generated from the source identifier, station code, start and end dates, and variable code). By default this is the working directory. |
| variable | Variable code. This is a required field. |
| cod | Station code. This is a required field. |
| nam | Station name. |
| lat | Station latitude (degrees North in decimal). |
| lon | Station longitude (degreees East in decimal). |
| alt | Station altitude (metres). |
| sou | Character string giving the source identifier. |
| link | Character string giving an url for metadata (e.g., link to the C3S Data Rescue registry). |
| units | Character string giving the units. This is a required field. |
| stat | Character string giving the statistic code. This is a required field. |
| metaHead | Character string giving metadata entries for the header (pipe separated). |
| meta | Character vector with length equal to the number of rows of Data, giving metadata entries for the single observations (pipe separated). |
| period | Observation time period code. Must be a character vector with length equal to the number of rows of Data unless all observations have the same period code. |
| time_offset | Numerical vector of offsets from UTC in hours. This value will be subtracted from the observation times to obtain UTC times, so for instance the offset of Central European Time is +1 hour. Recycled for all observations if only one value is given. |
| note | Character string to be added to the end of the standard output filename. It will be separated from the rest of the name by an underscore. Blanks will be also replaced by underscores. |
| keep_na | If FALSE (the default), lines where observations are NA are removed. |
| outfile | Output filename. If specified, ignores note. |

## Note

Times in SEF files must be expressed in UTC.

If outfile is not specified, the output filename is generated automatically as sou_cod_startdate_enddate_variable.tsv

## Author(s)

Yuri Brugnara

## Examples

```
# Create a basic SEF file for air temperature in Bern
# (assuming the observation times are in local solar time)
# The file will be written in the working directory
meta_bern <- Meta$ta[which(Meta$ta$id == "Bern"), ]
write_sef(Bern$ta[, 2:7], variable = "ta", cod = meta_bern$id, lat = meta_bern$lat,
          lon = meta_bern$lon, alt = meta_bern$alt, units = meta_bern$units,
          stat = "point", period = "0", time_offset = meta_bern$lon * 24 / 360)
```

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