Package 'Rgrib2'

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Title Read and work with GRIB binary files

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Description An R interface to the GRIB_API library developed by ECMWF. Decoding and encoding of GRIB files.

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R topics documented:

Gcreate 2
Gdec 3
Gdescribe 4
Gfind 5
Ghandle 6
Ginfo 7
Glocate 8
Gmod 9
Gopen 10
GRIBhandle 11
Gwrite 12

Index **13**

Gcreate *Create a new GRIB handle*

Description

Creates a new GRIBhandle object.

Usage

```
Gcreate(gribformat=2,domain,sample)
```

Arguments

gribformat	Denotes the GRIB edition: either 1 or 2.
domain	A geodomain object defining the grid. If domain is not specified, the grid definition of thye sample is unmodified.
sample	Character string. Denotes the name of a GRIBfile to be used as a template for the new message. TIf undefined, the default is "regular_ll_sfc_gribN" where N is the gribedition.

Details

This command returns a GRIBhandle. This message can then be further modified using Gmod.

Value

A GRIBhandle for a new GRIB message.

See Also

GRIBhandle, Gmod, Ghandle

Examples

```
## Not run:
#Get first 5 records of a file.
mygrib <-Gopen('filename')
#return level info from all messages in the file:
Ginfo(mygrib,IntPar=c("typeOfLevel","level"),rList=NULL)

## End(Not run)
```

Gdec *Decode a Grib message*

Description

returns the values stored in the grib record

Usage

```
Gdec(x, field=1, level = NULL, levelType = "P",
     get.meta = TRUE, multi = FALSE)
```

Arguments

x	An object of class "GRIBhandle" (or a file name or a GRIBlist, in which case field must be specified as an integer or a name.)
field	An integer indicating the position of the field in the file or list. Not used if x is a GRIBhandle.
level, levelType	Possibly add a level (pressure, height above surface).
get.meta	Logical key to retrieve parameter and date-time information.
multi	Setting this to TRUE turns on support for multi-field messages in GRIB2.

Details

takes an object of class "GRIBhandle" as input and returns the actual data. record can also be a filename or GRIBlist object, in which case field must be specified as an integer or a name.

Value

A data matrix with class "geofield" and attributes time, domain and description.

See Also

Gopen, Ghandle, GRIBhandle

Examples

```
## Not run:
#Get first 5 records of a file.
h1 <- Ghandle('filename',5)
#decode first record
mydata <- Gdec(h1)

## End(Not run)
```

`Gdescribe` *Extract parameter/time/level information from a GRIB message or file*

Description

Wrappers for Ginfo that do some further intepretation.‘

Usage

```
Gdescribe(gribhandle)
Gdescribe.extra(param,centre,subcentre,partab,process)
Gtime(gribhandle,...)
Glevel(gribhandle,...)
```

Arguments

`gribhandle`	A `GRIBhandle`.
`param, centre, subcentre, partab, process`	Integer values from GRIB-1.
`...`	Options for Ginfo.

Details

All these functions are called by `Gdec` to extract specific information. Gdescribe uses information from grib_api. Some local GRIB-1 tables may not be known to grib_api, and they may be made accessible via Gdescribe.extra.

Gtime and Glevel get specific information from a GRIBhandle.

Value

- Gdescribe() returns a list of parameter name, origin and level.
- Gdescribe.local() knows some local GRIB-1 tables unknown to grib_api.
- Gtime returns a string representation of forecast date and range.
- Glevel returns level information.

See Also

`Ginfo`, `Gopen`

Gfind *Locate GRIB message inside a file*

Description

Find the position of a particular message (field) inside a GRIB file.

Usage

```
Gfind(griblist, shortName = "t", level = NULL, levelType = "P", all = FALSE)
```

Arguments

griblist	Either a character string (filename) or a GRIBlist object. Anything that has a Ginfo method.
shortName	A character to be matched to the "shortName" field, or an integer to be matched to the parameter index. Currently, table2Version is not taken into account. Use Glocate for more detailed searches.
level, levelType	An integer according to the GRIB level type. It may also be a character similar to FA files ("P"=100,"H"=105 or "S"=107). This is only taken into account if level!=NULL.
all	If TRUE, all fields are returned. if FALSE, only the position(s)

Details

The function works by first calling Ginfo for the list of chosen parameters. Then the list is searched for messages that satisfy all the required values.

Value

A vector with the message indices of all messages that satisfy the required values of the parameters.

See Also

Glocate

Examples

```
## Not run:
#Find T2m in a file:
Gfind('filename',"z",levelType="P",level=500)

## End(Not run)
```

`Ghandle` *Create a Grib handle from a message in a file or a sample template*

Description

returns a GRIBhandle object for the message.

Usage

```
Ghandle(x, message, multi=FALSE)
```

Arguments

`x`	The name of a GRIB file. x may also be a GRIBlist object.
`imessage`	An integer indicating the position of the message in the file or list.
`multi`	Turn on support for multi-message records (experimental).

Details

takes an object of class "GRIBhandle" as input and returns the actual data. record can also be a filename or GRIBlist object, in which case field must be specified as an integer or a name.

Value

a GRIBhandle.

See Also

`Gopen`, `GRIBhandle`

Examples

```
## Not run:
#Get first 5 records of a file.
h1 <- Ghandle('filename',5)
#decode first record
mydata <- Gdec(h1)

## End(Not run)
```

Ginfo *Extract information from a GRIB message or file*

Description

Reads a list information of a Grib file (not the encoded data itself).

Usage

```
  Ginfo(x,...)
## S3 method for class 'GRIBhandle'
Ginfo(x,IntPar=c(),DblPar=c(),StrPar=c(),...)
## S3 method for class 'GRIBlist'
Ginfo(x,IntPar=c(),DblPar=c(),StrPar=c(),rList=NULL,multi=FALSE,...)
## S3 method for class 'character'
Ginfo(x,IntPar=c(),DblPar=c(),StrPar=c(),rList=NULL,multi=FALSE,...)
```

Arguments

x	An object of class GRIBhandle, a file name or a GRIBlist. In the first case, the
IntPar, StrPar, DblPar	Character vectors giving the names of integer, character (string) and numeric (double) parameters to be decoded from the message(s). The parameter names are as described in the GRIB_API documentation.
rList	An numeric vector indicating the position of the messages in the file. Not used if x is a GRIBhandle. The default is 1 (read only first message). If rList is NULL, all messages in the file are read.
multi	Logical. Setting it to TRUE allows for multi-data messages (UNTESTED!)
...	Not used.

Details

.

Value

A data.frame with one column per parameter and one row per GRIB message.

See Also

Gdec, Gopen, Gmod

Examples

```
## Not run:
#Get first 5 records of a file.
mygrib <-Gopen('filename')
#return level info from all messages in the file:
Ginfo(mygrib,IntPar=c("typeOfLevel","level"),rList=NULL)

## End(Not run)
```

`Glocate` *Locate GRIB message inside a file*

Description

Find the position of a particular message (field) insiode a GRIB file.

Usage

```
Glocate(filename,IntPar=list(),DblPar=list(),StrPar=list(),...)
```

Arguments

`filename`	Either a character string (filename) or a GRIBlist object. Anything that has a Ginfo method.
`IntPar, StrPar, DblPar`	Lists of parameters and their values for the wanted field.
`...`	Options for Ginfo.

Details

The function works by first calling Ginfo for the list of chosen parameters. Then the list is searched for messages that satisfy all the required values.

Value

A vector with the message indices of all messages that satisfy the required values of the parameters.

See Also

`Gdec`, `Gopen`, `Ginfo`

Examples

```
## Not run:
#Find T2m in a file:
Glocate('filename',StrPar=list(shortName="t2"))

## End(Not run)
```

Gmod *Modify parameters or data from a GRIB message*

Description

Modifies parameter entries and/or data in a GRIBhandle.

Usage

```
Gmod(x,IntPar=list(),StrPar=list(),DblPar=list(),data=NULL,precision=NULL
     nbits=NULL)
```

Arguments

x	An object of class GRIBhandle.
IntPar, StrPar, DblPar	Lists (or character vectors) giving the names of integer, character (string) and numeric (double) parameters to be modified in the message(s), and the new values.
data	Data vector to be encoded in x.
multi	Logical. Setting it to TRUE allows for multi-data messages (UNTESTED!)
precision	Integer value for decimal precision of the GRIB packing. Alternatively, one may fix the number of bits per value.
nbits	Bits per value in the GRIB packing. If it is not precisied, GRIB_API defaults to 24 bits.

Value

No return value (NULL).

See Also

Gdec, Gopen, Gmod, Gwrite

Examples

```
## Not run:
#Get first 5 records of a file.
mygrib <-Gopen('filename')
#return level info from all messages in the file:
a <- Ghandle(mygrib,1)
Gmod(a,IntPar=list(typeOfLevel=105,level=500),data=Gdec(a)*5)
Gwrite(a,file=newfile,append=TRUE)

## End(Not run)
```

Gopen *Open a Grib file*

Description

Reads the basic information of a Grib file (not the data itself).

Usage

```
Gopen(filename,IntPar = c("editionNumber", "dataDate", "dataTime",
  "validityDate", "validityTime", "Nx", "Ny", "table2Version",
  "indicatorOfParameter", "indicatorOfTypeOfLevel", "level"),
  DblPar = c(), StrPar = c("shortName", "gridType"),
  multi = FALSE,lextra=TRUE)
```

Arguments

filename	A character string pointing at a GRIB file.
IntPar,DblPar,StrPar	The list of keys to be read for all records in the file.
multi	If TRUE, multi-field messages are allowed.
lextra	If TRUE, the GRIB-1 records not recognized by grib_api are matched to an internal table with some extra table2 versions.

Value

a data.frame of class GRIBlist, containing the basic information of the data in the file.

See Also

Ginfo, Gdec, iview

Examples

```
## Not run:
#Get first 5 records of a file.
mylist <- Gopen('filename')
#one grib record:
mylist[1,]
Gdec(mylist,1)

## End(Not run)
```

GRIBhandle *GRIBhandle class*

Description

GRIBhandle objects are pointers to a grib message that is loaded in memory. They can be read from a file with `Ghandle` or created by `Gcreate`. GRIBhandle objects are similar to connections in R. They can be closed explicitely, but this is not really necessary in general, unless you have many open handles conatining large fields. Freeing a GRIBhandle also frees the memory that contains the GRIB message.

Usage

```
Ghandle(x,message=1, multi=FALSE)
GhandleList()
GhandleCount()
GhandleFree(gribhandle)
GhandleFreeAll()
```

Arguments

`x`	A GRIBlist class object or the name of a GRIB file.
`message`	An integer indicating the position in the list of the message to be opened.
`multi`	Set to TRUE for experimental support of multi-message GRIB records.
`gribhandle`	A GRIBhandle

Details

GRIBhandles are objects that store a pointer to some GRIB message in memory.

Value

- Ghandle returns a GRIBhandle class object.
- GhandleList() returns a list of current GRIBhandles.
- GhandleCount() returns teh number of handles.
- GhandleFree() clears a GRIBhandle.
- GhandleFreeAll() clears all GRIBhandles.

See Also

`Gopen`,`Gmod`, `Gdec`,`Gwrite`

Examples

```
## Not run:
#Get 5th message in a file.
h1 <- Ghandle('filename',5)
GhandleList()
GhandleFree(h1)

## End(Not run)
```

Gwrite *Write a GRIB message (handle) to a file.*

Description

Writes a GRIB message.

Usage

```
Gwrite(gribhandle,filename,append=TRUE)
```

Arguments

gribhandle	An object of class GRIBhandle.
filename	Character string giving the file name to write the message to. If the file does not yet exist, it is created. If it already exists, behaviour depends on append.
append	Logical. If TRUE, the message is appended to the file (if it exists). If FALSE, the complete file is overwritten.

Value

NULL

See Also

Gdec, Gopen, Gmod

Examples

```
## Not run:
#Get first 5 records of a file.
mygrib <-Ghandle('filename',1)
#return level info from all messages in the file:
Gwrite(mygrib,newfile,append=TRUE)

## End(Not run)
```

Index

∗Topic **file**
Gcreate, 2
Gdec, 3
Gdescribe, 4
Gfind, 5
Ghandle, 6
Ginfo, 7
Glocate, 8
Gmod, 9
Gopen, 10
GRIBhandle, 11
Gwrite, 12

close.GRIBhandle *(*GRIBhandle*)*, 11

Gcreate, 2
Gdec, 3, *7–12*
Gdescribe, 4
Gfind, 5
Ghandle, *2, 3*, 6
Ghandle *(*GRIBhandle*)*, 11
GhandleCount *(*GRIBhandle*)*, 11
GhandleFree *(*GRIBhandle*)*, 11
GhandleFreeAll *(*GRIBhandle*)*, 11
GhandleList *(*GRIBhandle*)*, 11
Ginfo, *4*, 7, *8*, *10*
Glevel *(*Gdescribe*)*, 4
Glocate, *5*, 8
Gmod, *2*, *7*, *9*, 9, *11, 12*
Gopen, *3, 4*, *6–9*, 10, *11, 12*
GRIB find *(*Gfind*)*, 5
GRIB locate *(*Glocate*)*, 8
GRIB modify *(*Gmod*)*, 9
GRIB open *(*Gopen*)*, 10
GRIB write *(*Gwrite*)*, 12
GRIB-decode *(*Gdec*)*, 3
GRIBhandle, *2, 3*, *6*, 11
Gtime *(*Gdescribe*)*, 4
Gwrite, *9*, *11*, 12

iview, *10*