

Design of Database

For each file, we add an entry in FILES and for each global attribute in that file we add an entry in GLOBAL_ATTRIBUTES.

For each coordinate in a file, if a coordinate with the same name, nvals, min_val, max_val, and any discrete_coord_vals and 'units' and 'calendar' attributes does not already exist, we add an entry in COORDS. If one of the attributes (but not 'units' or 'calendar') is different, we'll set the value to 'File specific' as for this application we don't really care. In this way we will only have one COORD entry for coordinates that look the same in different files.

For each variable in a file, if an entry for the variable does not already exist in VARIABLES and have the same list of attributes with the same value for 'units', 'long name' or 'standard name we will add an entry in VARIABLES and entries in VAR_ATTRIBUTES. If the variable exists but the new one has different values for attributes other than those mentioned above (e.g. 'scale factor') we will set the value of that attribute to 'File specific'. To identify which files and which coordinates go with this variable, we will add entries to COORDS_AND_FIDS_OF_VARIABLES. If the cids for all fids of a variable are the same, we will only add one entry with fid=-1

FILES				
FID	pathname	Symbolic link	created	modified
1	Africa/200001_pl.nc		2020/1/1	2020/1/1

DISCREET_COORD_VALS	
value	CID
1000	4
850	4
400	4

GLOBAL_ATTRIBUTES		
name	value	FID
history	Created 2020/01/01	1

COORDS					
CID	name	nvals	min_val	max_val	delta
1	longitude	400	-35	35	0.25
2	latitude	400	-40	30	0.25
3	time	720	12045.67	23456.78	24
4	Level	3	100	1000	0

VARIABLES	
VID	name
1	w

COORD_ATTRIBUTES		
name	value	CID
units	degrees	1
units	degrees	2
units	Hours since 1900-01-01 0:00	3
calendar	gregorian	3
units	millibars	4

COORDS_AND_FIDS_OF_VARIABLES		
VID	CID	FID
1	1	1
1	2	1
1	3	1
1	4	1

VAR_ATTRIBUTES		
name	value	VID
long_name	Vertical velocity	1
units	m/s	1
Scale_factor	File_specific	1

Metaview GUI to display results

This is run using:
python metaview.py <dbname> <[coordinate list for filters, e.g. latitude longitude time level]>

Directory button allows user to choose a subdirectory within the database from a dropdown list
Variables button allows user to choose a single variable to find in the database from a dropdown list
Min and max values of coordinates can be added by the user to filter results.
Search button will perform the database search to find matching variables that exist within files in the subdirectory (or all files if directory=*) and also having coordinates within any ranges set.

Initial screen

metaview: /nfs/a319/earjacr/CEMAC/ERA5_Africa.db

Directory	*		
Variable	*		
min longitude:		max longitude:	
min latitude:		max latitude:	
min level:		max level:	
min time (YYYY-MM-DD):		max time (YYYY-MM-DD):	
			Search

After clicking Search, the results will appear in the lower frame of the window, e.g. when the variable is set to *, the following results are displayed:

metaview: /nfs/a319/earjacr/CEMAC/ERA5_Africa.db

Directory

*

Variable

*

min longitude:

max longitude:

min latitude:

max latitude:

min level:

max level:

min time (YYYY-MM-DD):

max time (YYYY-MM-DD):

Search

vo (time,level,latitude,longitude,) for 492 files
pv (time,level,latitude,longitude,) for 492 files
t (time,level,latitude,longitude,) for 492 files
q (time,level,latitude,longitude,) for 492 files
u (time,level,latitude,longitude_2,) for 492 files
v (time,level,latitude,longitude_2,) for 492 files
p84.162 (time,latitude,longitude,) for 493 files
u10 (time,latitude,longitude,) for 492 files
v10 (time,latitude,longitude,) for 492 files
t2m (time,latitude,longitude,) for 492 files
msl (time,latitude,longitude,) for 492 files
tcw (time,latitude,longitude,) for 492 files
sp (time,latitude,longitude,) for 492 files
d2m (time,latitude,longitude,) for 492 files
blh (time,latitude,longitude,) for 492 files
mslhf (time,latitude,longitude,) for 492 files
msnlwrf (time,latitude,longitude,) for 492 files
msnswrf (time,latitude,longitude,) for 492 files
msshf (time,latitude,longitude,) for 492 files
mtnlwrf (time,latitude,longitude,) for 492 files

Selecting a variable

Click on the variable button and the dropdown menu to select variable appears. Once a value has been chosen, the name of the variable will replace the * currently in the variable label.

metaview: /nfs/a319/earjacr/CEMAC/ERA5_Africa.db

Directory	*			
Variable	*			
* blh d2m lsm msl mslhf msnlwrf msnswrf msshf mtnlwrf p84.162 pv q sp t t2m tcw u u10 v v10 vo w z	de:	<input type="text"/>	max longitude:	<input type="text"/>
	e:	<input type="text"/>	max latitude:	<input type="text"/>
		<input type="text"/>	max level:	<input type="text"/>
	YYY-MM-DD):	<input type="text"/>	max time (YYY-MM-DD):	<input type="text"/>
	<div>Search</div>			

After choosing a variable, the results text is cleared. On clicking Search, the results for the variable will appear in the lower frame of the window, e.g. when the variable is set to v10, the following results are displayed:

metaview: /nfs/a319/earjacr/CEMAC/ERA5_Africa.db

Directory

*

Variable

v10

min longitude:

max longitude:

min latitude:

max latitude:

min level:

max level:

min time (YYYY-MM-DD):

max time (YYYY-MM-DD):

Search

v10 (time,latitude,longitude,) for 492 files

Clicking over a variable name in the results shows the attributes of the variable in a popup window. This window can be closed by clicking on the x

metaview: /nfs/a319/earjacr/CEMAC/ERA5_Africa.db

Directory

Variable

*

*

min longitude:

min latitude:

min level:

min time (YYYY-MM-DD):

max longitude:

max latitude:

max level:

max time (YYYY-MM-DD):

Search

vo: attributes

standard_name : atmosphere_relative_vorticity

long_name : Vorticity (relative)

units : s*-1

add_offset : File specific

scale_factor : File specific

_FillValue : -3.3e+04

missing_value : -3.3e+04

t2m (time,latitude,longitude,) for 492 files

msl (time,latitude,longitude,) for 492 files

tcw (time,latitude,longitude,) for 492 files

sp (time,latitude,longitude,) for 492 files

d2m (time,latitude,longitude,) for 492 files

blh (time,latitude,longitude,) for 492 files

mslhf (time,latitude,longitude,) for 492 files

msnlwrf (time,latitude,longitude,) for 492 files

msnswrf (time,latitude,longitude,) for 492 files

msshf (time,latitude,longitude,) for 492 files

mtnlwrf (time,latitude,longitude,) for 492 files

Clicking over a coordinate of a variable in the results shows the range of that coordinate in a popup window. The 1st example shows a coordinate with evenly spaced values.

metaview: /nfs/a319/earjacr/CEMAC/ERA5_Africa.db

Directory

*

Variable

*

min longitude:

max longitude:

min latitude:

max latitude:

min level:

max level:

min time (YYYY-MM-DD):

max time (YYYY-MM-DD):

Search

latitude

—

□

×

vo (time,level,latitude,longitude,) for 492 files
pv (time,level,latitude,longitude,) for 492 files
t (time,level,latitude,longitude,) for 492 files
q (time,level,latitude,longitude,) for 492 files
u (time,level,latitude,longitude_2,) for 492 files
v (time,level,latitude,longitude_2,) for 492 files
p84.162 (time,latitude,longitude,) for 493 files
u10 (time,latitude,longitude,) for 492 files
v10 (time,latitude,longitude,) for 492 files
t2m (time,latitude,longitude,) for 492 files
msl (time,latitude,longitude,) for 492 files
tcw (time,latitude,longitude,) for 492 files
sp (time,latitude,longitude,) for 492 files
d2m (time,latitude,longitude,) for 492 files
blh (time,latitude,longitude,) for 492 files
mslhf (time,latitude,longitude,) for 492 files
msnlwrf (time,latitude,longitude,) for 492 files
msnswrf (time,latitude,longitude,) for 492 files
msshf (time,latitude,longitude,) for 492 files
mtnlwrf (time,latitude,longitude,) for 492 files

The 2nd example shows a coordinate with discrete values.

metaview: /nfs/a319/earjacr/CEMAC/ERA5_Africa.db

Directory

*

Variable

*

min longitude:

max longitude:

min latitude:

max latitude:

min level:

max level:

min time (YYYY-MM-DD):

max time (YYYY-MM-DD):

Search

level

—

□

×

vo (time,level,latitude,longitude,) for 492 files
pv (time,level,latitude,longitude,) for 492 files
t (time,level,latitude,longitude,) for 492 files
q (time,level,latitude,longitude,) for 492 files
u (time,level,latitude,longitude_2,) for 492 files
v (time,level,latitude,longitude_2,) for 492 files
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u10 (time,latitude,longitude,) for 492 files
v10 (time,latitude,longitude,) for 492 files
t2m (time,latitude,longitude,) for 492 files
msl (time,latitude,longitude,) for 492 files
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sp (time,latitude,longitude,) for 492 files
d2m (time,latitude,longitude,) for 492 files
blh (time,latitude,longitude,) for 492 files
mslhf (time,latitude,longitude,) for 492 files
msnlwrf (time,latitude,longitude,) for 492 files
msnswrf (time,latitude,longitude,) for 492 files
msshf (time,latitude,longitude,) for 492 files
mtnlwrf (time,latitude,longitude,) for 492 files

The 3rd example is for a dimension which has coordinates over multiple files. Note that the popup window has a scroll bar.

metaview: /nfs/a319/earjacr/CEMAC/ERA5_Africa.db

Directory

*

Variable

*

min longitude:

max longitude:

min latitude:

max latitude:

min level:

max level:

min time (YYYY-MM-DD):

max time (YYYY-MM-DD):

Search

vo: time

1979/01/01 00:00 to 1979/01/31 23:00 every 1.00 hours in /nfs/a321/datasets/ERA5/Africa/011979_pl.nc

1979/02/01 00:00 to 1979/02/28 23:00 every 1.00 hours in /nfs/a321/datasets/ERA5/Africa/021979_pl.nc

1979/03/01 00:00 to 1979/03/31 23:00 every 1.00 hours in /nfs/a321/datasets/ERA5/Africa/031979_pl.nc

1979/04/01 00:00 to 1979/04/30 23:00 every 1.00 hours in /nfs/a321/datasets/ERA5/Africa/041979_pl.nc

1979/05/01 00:00 to 1979/05/31 23:00 every 1.00 hours in /nfs/a321/datasets/ERA5/Africa/051979_pl.nc

1979/06/01 00:00 to 1979/06/30 23:00 every 1.00 hours in /nfs/a321/datasets/ERA5/Africa/061979_pl.nc

1979/07/01 00:00 to 1979/07/31 23:00 every 1.00 hours in /nfs/a321/datasets/ERA5/Africa/071979_pl.nc

1979/08/01 00:00 to 1979/08/31 23:00 every 1.00 hours in /nfs/a321/datasets/ERA5/Africa/081979_pl.nc

1979/09/01 00:00 to 1979/09/30 23:00 every 1.00 hours in /nfs/a321/datasets/ERA5/Africa/091979_pl.nc

1979/10/01 00:00 to 1979/10/31 23:00 every 1.00 hours in /nfs/a321/datasets/ERA5/Africa/101979_pl.nc

1979/11/01 00:00 to 1979/11/30 23:00 every 1.00 hours in /nfs/a321/datasets/ERA5/Africa/111979_pl.nc

1979/12/01 00:00 to 1979/12/31 23:00 every 1.00 hours in /nfs/a321/datasets/ERA5/Africa/121979_pl.nc

d2m (time,latitude,longitude,) for 492 files

blh (time,latitude,longitude,) for 492 files

mslhf (time,latitude,longitude,) for 492 files

msnlwrf (time,latitude,longitude,) for 492 files

msnswrf (time,latitude,longitude,) for 492 files

msshf (time,latitude,longitude,) for 492 files

mntlwrf (time,latitude,longitude,) for 492 files

Clicking over ‘for XX files’ in the results shows the pathnames of the files in a popup window. If one of the pathnames in the popup window is then clicked, the details of that file appear in a popup box . To close this popup box, the user must click inside the box.

metaview: /nfs/a319/earjacr/CEMAC/ERA5_Africa.db

Directory

Variable

*

*

min longitude:

min latitude:

min level:

min time (YYYY-MM-DD):

max longitude:

max latitude:

max level:

max time (YYYY-MM-DD):

Search

vo (time,level,latitude,longitude,) for 492 files

pv (time,level,latitude,longitude,) for 492 files

t (time,level,latitude,longitude,) for 492 files

q (time,level,latitude,longitude,) for 492 files

u (time,level,latitude,longitude_2,) for 492 files

v (time,level,latitude,longitude_2,) for 492 files

p84.162 (time,latitude,longitude,) for 493 files

u10 (time,latitude,longitude,) for 492 files

v10 (time,latitude,longitude,) for 492 files

t2m (time,latitude,longitude,) for 492 files

msl (time,latitude,longitude,) for 492 files

tcw (time,latitude,longitude,) for 492 files

sp (time,latitude,longitude,) for 492 files

d2m (time,latitude,longitude,) for 492 files

blh (time,latitude,longitude,) for 492 files

mslhf (time,latitude,longitude,) for 492 files

msnlwrf (time,latitude,longitude,) for 492 files

msnswrf (time,latitude,longitude,) for 492 files

msshf (time,latitude,longitude,) for 492 files

mtnlwrf (time,latitude,longitude,) for 492 files

valid files

/nfs/a321/datasets/ERA5/Africa/011979_pl.nc

/nfs/a321/datasets/ERA5/Africa/021979_pl.nc

/nfs/a321/datasets/ERA5/Africa/031979_pl.nc

/nfs/a321/datasets/ERA5/Africa/031979_pl.nc

/nfs/a321/datasets/ERA5/Africa/031979_pl.nc

symlink=/nfs/a37/earrjk/datasets/ERA5/Africa/031979_pl.nc

created=2021-11-16 23:25

modified=2020-11-22 13:29

/nfs/a321/datasets/ERA5/Africa/081979_pl.nc

/nfs/a321/datasets/ERA5/Africa/091979_pl.nc

/nfs/a321/datasets/ERA5/Africa/101979_pl.nc

/nfs/a321/datasets/ERA5/Africa/111979_pl.nc

/nfs/a321/datasets/ERA5/Africa/121979_pl.nc

The user may select min and max values of coordinates to filter the results. On changing any of these filters, the results screen is cleared, and Search must be clicked again to perform the filtering.

metaview: /nfs/a319/earjacr/CEMAC/ERA5_Africa.db

Directory

*

Variable

*

min longitude:

max longitude:

min latitude:

max latitude:

min level:

max level:

min time (YYYY-MM-DD):

2018-01-01

max time (YYYY-MM-DD):

2018-12-31

Search

vo (time,level,latitude,longitude,) for 12 files
pv (time,level,latitude,longitude,) for 12 files
t (time,level,latitude,longitude,) for 12 files
q (time,level,latitude,longitude,) for 12 files
u (time,level,latitude,longitude_2,) for 12 files
v (time,level,latitude,longitude_2,) for 12 files
p84.162 (time,latitude,longitude,) for 12 files
u10 (time,latitude,longitude,) for 12 files
v10 (time,latitude,longitude,) for 12 files
t2m (time,latitude,longitude,) for 12 files
msl (time,latitude,longitude,) for 12 files
tcw (time,latitude,longitude,) for 12 files
sp (time,latitude,longitude,) for 12 files
d2m (time,latitude,longitude,) for 12 files
blh (time,latitude,longitude,) for 12 files
mslhf (time,latitude,longitude,) for 12 files
msnlwrf (time,latitude,longitude,) for 12 files
msnswrf (time,latitude,longitude,) for 12 files
msshf (time,latitude,longitude,) for 12 files
mtnlwrf (time,latitude,longitude,) for 12 files