

CDO Reference Card

Climate Data Operators

Version 1.4.1

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http://www.mpimet.mpg.de/cdo

Syntax

cdo	[Options]	Operator1 [−Operator2 [−OperatorN]]
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Options

-a	Convert from a relative to an absolute time axis
-b <nbits>	Set the number of bits for the output precision (32/64 for nc,nc2,nc4,srv,ext,ieg; 1 - 32 for grb) Add L or B for Little or Big endian byteorder
-f <format>	Output file format (grb,nc,nc2,nc4,srv,ext,ieg)
-g <grid>	Grid name or file Available grids: t<RES>grid, r<NX>x<NY>
-h	Help information for the operators
-m <missval>	Set the default missing value (default: -9e+33)
-R	Convert GRIB data from reduced to regular grid
-r	Convert from an absolute to a relative time axis
-s	Silent mode
-t <table>	Set the parameter table name or file Predefined tables: echam4 echam5 mpiom1
-V	Print the version number
-v	Print extra details for some operators
-z szip	Compress GRIB records with szip

Operators

Information

info	Dataset information listed by code number
infov	Dataset information listed by variable name
map	Dataset information and simple map
Syntax	<operator> ifiles

sinfo	Short dataset information listed by code number
sinfov	Short dataset information listed by variable name
Syntax	<operator> ifiles

diff	Compare two datasets listed by code number
diffv	Compare two datasets listed by variable name
Syntax	<operator> ifile1 ifile2

npar	Number of parameters
nlevel	Number of levels
nyear	Number of years
nmon	Number of months
ndate	Number of dates
ntime	Number of time steps
Syntax	<operator> ifile

showformat	Show file format
showcode	Show code numbers
showname	Show variable names
showstdname	Show standard names
showlevel	Show levels
showtype	Show GRIB level types
showyear	Show years
showmon	Show months
showdate	Show dates
showtime	Show time steps
Syntax	<operator> ifile

pardes	Parameter description
griddes	Grid description
zaxisdes	Z-axis description
vct	Vertical coordinate table
Syntax	<operator> ifile

File operations

copy	Copy datasets
cat	Concatenate datasets
Syntax	<operator> ifiles ofile
replace	Replace variables
Syntax	replace ifile1 ifile2 ofile

merge	Merge datasets with different fields
mergetime	Merge datasets sorted by date and time
Syntax	<operator> ifiles ofile

splitcode	Split code numbers
splitname	Split variable names
splitlevel	Split levels
splitgrid	Split grids
splitzaxis	Split z-axes
Syntax	<operator> ifile oprefix

splithour	Split hours
splitday	Split days
splitmon	Split months
splitseas	Split seasons
splityear	Split years
Syntax	<operator> ifile oprefix

splitsel	Split time selection
Syntax	splitsel,nsets[,noffset[,nskip]] ifile oprefix

Selection

selcode	Select variables by code number
delcode	Delete variables by code number
Syntax	<operator>,.codes ifile ofile
selname	Select variables by name
delname	Delete variables by name
Syntax	<operator>,.varnames ifile ofile
selstdname	Select variables by standard name
Syntax	selstdname,stdnames ifile ofile
sellevel	Select levels
Syntax	sellevel,levels ifile ofile
sellevidx	Select levels by index
Syntax	sellevidx,levidx ifile ofile
selgrid	Select grids
Syntax	selgrid,grids ifile ofile
selzaxis	Select z-axes
Syntax	selzaxis,zaxes ifile ofile
selltype	Select GRIB level types
Syntax	selltype,types ifile ofile
seltabnum	Select parameter table numbers
Syntax	seltabnum,tabnums ifile ofile

seltimestep	Select time steps
Syntax	seltimestep,timesteps ifile ofile
seltime	Select times
Syntax	seltime,times ifile ofile
selhour	Select hours
Syntax	selhour,hours ifile ofile
selday	Select days
Syntax	selday,days ifile ofile
selmon	Select months
Syntax	selmon,months ifile ofile
selyear	Select years
Syntax	selyear,years ifile ofile
selseas	Select seasons
Syntax	selseas,seasons ifile ofile
seldate	Select dates
Syntax	seldate,date1[,date2] ifile ofile
selsmon	Select single month
Syntax	selsmon,month[,nts1[,nts2]] ifile ofile

sellonlatbox	Select a longitude/latitude box
Syntax	sellonlatbox,lon1,lon2,lat1,lat2 ifile ofile
selindexbox	Select an index box
Syntax	selindexbox,idx1,idx2,idy1,idy2 ifile ofile

Conditional selection

ifthen	If then
ifnotthen	If not then
Syntax	<operator> ifile1 ifile2 ofile

ifthenelse	If then else
Syntax	ifthenelse ifile1 ifile2 ifile3 ofile

ifthenc	If then constant
ifnotthenc	If not then constant
Syntax	<operator>,.c ifile ofile

Comparison

eq	Equal
ne	Not equal
le	Less equal
lt	Less than
ge	Greater equal
gt	Greater than
Syntax	<operator> ifile1 ifile2 ofile

eqc	Equal constant
nec	Not equal constant
lec	Less equal constant
ltc	Less than constant
gec	Greater equal constant
gtc	Greater than constant
Syntax	<operator>,.c ifile ofile

Modification

setpartab	Set parameter table
Syntax	setpartab,table ifile ofile
setcode	Set code number
Syntax	setcode,code ifile ofile
setname	Set variable name
Syntax	setname,name ifile ofile
setlevel	Set level
Syntax	setlevel,level ifile ofile
setltype	Set GRIB level type
Syntax	setltype,ltype ifile ofile

setdate	Set date
Syntax	setdate,date ifile ofile
settime	Set time of the day
Syntax	settime,time ifile ofile
setday	Set day
Syntax	setday,day ifile ofile
setmon	Set month
Syntax	setmon,month ifile ofile
setyear	Set year
Syntax	setyear,year ifile ofile
setunits	Set time units
Syntax	setunits,units ifile ofile
settaxis	Set time axis
Syntax	settaxis,date,time[,inc] ifile ofile
setreftime	Set reference time
Syntax	setreftime,date,time[,units] ifile ofile
setcalendar	Set calendar
Syntax	setcalendar,calendar ifile ofile
shifttime	Shift time steps
Syntax	shifttime,sval ifile ofile

chcode	Change code number
Syntax	chcode,oldcode,newcode[,...] ifile ofile
chname	Change variable name
Syntax	chname,oldname,newname,... ifile ofile
chlevel	Change level
Syntax	chlevel,oldlev,newlev,... ifile ofile
chlevelc	Change level of one code
Syntax	chlevelc,code,oldlev,newlev ifile ofile
chlevelv	Change level of one variable
Syntax	chlevelv,name,oldlev,newlev ifile ofile

setgrid	Set grid
Syntax	setgrid,grid ifile ofile
setgridtype	Set grid type
Syntax	setgridtype,gridtype ifile ofile

setzaxis	Set z-axis
Syntax	setzaxis,zaxis ifile ofile

setgatt	Set global attribute
Syntax	setgatt,attname,attstring ifile ofile
setgatts	Set global attributes
Syntax	setgatts,attfile ifile ofile

invertlat	Invert latitudes
Syntax	invertlat ifile ofile

invertlev	Invert levels
Syntax	invertlev ifile ofile

maskregion	Mask regions
Syntax	maskregion,regions ifile ofile

masklonlatbox	Mask a longitude/latitude box
Syntax	masklonlatbox,lon1,lon2,lat1,lat2 ifile ofile
maskindexbox	Mask an index box
Syntax	maskindexbox,idx1,idx2,idy1,idy2 ifile ofile

setclonlatbox	Set a longitude/latitude box to constant
Syntax	setclonlatbox,c,lon1,lon2,lat1,lat2 ifile ofile
setcindexbox	Set an index box to constant
Syntax	setcindexbox,c,idx1,idx2,idy1,idy2 ifile ofile

enlarge	Enlarge fields
Syntax	enlarge,grid ifile ofile

setmissval	Set a new missing value
Syntax	setmissval,newmiss ifile ofile
setctomiss	Set constant to missing value
setmisstoc	Set missing value to constant
Syntax	<operator>,.c ifile ofile
setrtomiss	Set range to missing value
setvrange	Set valid range
Syntax	<operator>,.rmin,rmax ifile ofile

Arithmetic

expr	Evaluate expressions
Syntax	expr , <i>instr</i> ifile ofile
exprf	Evaluate expressions from script file
Syntax	exprf , <i>filename</i> ifile ofile
abs	Absolute value
int	Integer value
nint	Nearest integer value
pow	Power
sqr	Square
sqrt	Square root
exp	Exponential
ln	Natural logarithm
log10	Base 10 logarithm
sin	Sine
cos	Cosine
tan	Tangent
asin	Arc sine
acos	Arc cosine
reci	Reciprocal value
Syntax	<operator> ifile ofile

addc	Add a constant
subc	Subtract a constant
mulc	Multiply with a constant
divc	Divide by a constant
Syntax	<operator> , <i>c</i> ifile ofile

add	Add two fields
sub	Subtract two fields
mul	Multiply two fields
div	Divide two fields
min	Minimum of two fields
max	Maximum of two fields
atan2	Arc tangent of two fields
Syntax	<operator> ifile1 ifile2 ofile

monadd	Add monthly time series
monsub	Subtract monthly time series
monmul	Multiply monthly time series
monddiv	Divide monthly time series
Syntax	<operator> ifile1 ifile2 ofile

ymonadd	Add multi-year monthly time series
ymonsub	Subtract multi-year monthly time series
ymonmul	Multiply multi-year monthly time series
ymonddiv	Divide multi-year monthly time series
Syntax	<operator> ifile1 ifile2 ofile

muldpm	Multiply with days per month
divdpm	Divide by days per month
muldpy	Multiply with days per year
divdpy	Divide by days per year
Syntax	<operator> ifile ofile

Statistical values

	Available statistical functions	<STAT>
	minimum	min
	maximum	max
	sum	sum
	mean	mean
	average	avg
	variance	var
	standard deviation	std
ens<STAT>	Statistical values over an ensemble	
Syntax	<operator> ifiles ofile	
enspctl	Ensemble percentiles	
Syntax	enspctl , <i>p</i> ifiles ofile	
fld<STAT>	Statistical values over a field	
Syntax	<operator> ifile ofile	
fldpctl	Field percentiles	
Syntax	fldpctl , <i>p</i> ifile ofile	

zon<STAT>	Zonal statistical values	
Syntax	<operator> ifile ofile	
zonpctl	Zonal percentiles	
Syntax	zonpctl , <i>p</i> ifile ofile	
mer<STAT>	Meridional statistical values	
Syntax	<operator> ifile ofile	
merpctl	Meridional percentiles	
Syntax	merpctl , <i>p</i> ifile ofile	
vert<STAT>	Vertical statistical values	
Syntax	<operator> ifile ofile	
timsel<STAT>	Time range statistical values	
Syntax	<operator> , <i>nsets</i> [, <i>noffset</i> [, <i>nskip</i>]] ifile ofile	

timselfpctl	Time range percentiles	
Syntax	timselfpctl , <i>p</i> , <i>nsets</i> [, <i>noffset</i> [, <i>nskip</i>]] ifile1 ifile2 ifile3 ofile	

run<STAT>	Running statistical values	
Syntax	<operator> , <i>nts</i> ifile ofile	

runpctl	Running percentiles	
Syntax	runpctl , <i>p</i> , <i>nts</i> ifile1 ofile	

tim<STAT>	Statistical values over all time steps	
Syntax	<operator> ifile ofile	

timpctl	Time percentiles	
Syntax	timpctl , <i>p</i> ifile1 ifile2 ifile3 ofile	

hour<STAT>	Hourly statistical values	
Syntax	<operator> ifile ofile	

hourpctl	Hourly percentiles	
Syntax	hourpctl , <i>p</i> ifile1 ifile2 ifile3 ofile	

day<STAT>	Daily statistical values	
Syntax	<operator> ifile ofile	

daypctl	Daily percentiles	
Syntax	daypctl , <i>p</i> ifile1 ifile2 ifile3 ofile	

mon<STAT>	Monthly statistical values	
Syntax	<operator> ifile ofile	

monpctl	Monthly percentiles	
Syntax	monpctl , <i>p</i> ifile1 ifile2 ifile3 ofile	

year<STAT>	Yearly statistical values	
Syntax	<operator> ifile ofile	

yearpctl	Yearly percentiles	
Syntax	yearpctl , <i>p</i> ifile1 ifile2 ifile3 ofile	

seas<STAT>	Seasonal statistical values	
Syntax	<operator> ifile ofile	

seaspctl	Seasonal percentiles	
Syntax	seaspctl , <i>p</i> ifile1 ifile2 ifile3 ofile	

yhour<STAT>	Multi-year hourly statistical values	
Syntax	<operator> ifile ofile	

yday<STAT>	Multi-year daily statistical values	
Syntax	<operator> ifile ofile	

ydaypctl	Multi-year daily percentiles	
Syntax	ydaypctl , <i>p</i> ifile1 ifile2 ifile3 ofile	

ymon<STAT>	Multi-year monthly statistical values	
Syntax	<operator> ifile ofile	

ymonpctl	Multi-year monthly percentiles	
Syntax	ymonpctl , <i>p</i> ifile1 ifile2 ifile3 ofile	

yseas<STAT>	Multi-year seasonal statistical values	
Syntax	<operator> ifile ofile	

yseaspctl	Multi-year seasonal percentiles	
Syntax	yseaspctl , <i>p</i> ifile1 ifile2 ifile3 ofile	

ydrun<STAT>	Multi-year daily running statistical values	
Syntax	<operator> , <i>nts</i> ifile ofile	

ydrunpctl	Multi-year daily running percentiles	
Syntax	ydrunpctl , <i>p</i> , <i>nts</i> ifile1 ifile2 ifile3 ofile	

Regression

regres	Regression	
Syntax	regres ifile ofile	

detrend	Detrend	
Syntax	detrend ifile ofile	

trend	Trend	
Syntax	trend ifile ofile1 ofile2	

subtrend	Subtract trend	
Syntax	subtrend ifile1 ifile2 ifile3 ofile	

Interpolation

remapbil	Bilinear interpolation	
remapbic	Bicubic interpolation	
remapdis	Distance-weighted average remapping	
remapnn	Nearest neighbor remapping	
remapcon	First order conservative remapping	
remapcon2	Second order conservative remapping	
remaplaf	Largest area fraction remapping	
Syntax	<operator> , <i>grid</i> ifile ofile	

genbil	Generate bilinear interpolation weights	
genbic	Generate bicubic interpolation weights	
gendis	Generate distance-weighted average remap weights	
gennn	Generate nearest neighbor remap weights	
gencon	Generate 1st order conservative remap weights	
gencon2	Generate 2nd order conservative remap weights	
genlaf	Generate largest area fraction remap weights	
Syntax	<operator> , <i>grid</i> ifile ofile	

remap	SCRIP grid remapping	
Syntax	remap , <i>grid</i> , <i>weights</i> ifile ofile	

interpolate	PINGO grid interpolation	
Syntax	interpolate , <i>grid</i> ifile ofile	

remapeta	Remap vertical hybrid level	
Syntax	remapeta , <i>vct</i> [, <i>oro</i>] ifile ofile	

ml2pl	Model to pressure level interpolation	
Syntax	ml2pl , <i>plevels</i> ifile ofile	

ml2hl	Model to height level interpolation	
Syntax	ml2hl , <i>hlevels</i> ifile ofile	

intlevel	Linear level interpolation	
Syntax	intlevel , <i>levels</i> ifile ofile	

inttime	Interpolation between time steps	
Syntax	inttime , <i>date</i> , <i>time</i> [, <i>inc</i>] ifile ofile	

intntime	Interpolation between time steps	
Syntax	intntime , <i>n</i> ifile ofile	

intyear	Interpolation between two years	
Syntax	intyear , <i>years</i> ifile1 ifile2 oprefix	

Transformation

sp2gp	Spectral to gridpoint	
sp2spl	Spectral to gridpoint (linear)	
gp2sp	Gridpoint to spectral	
gp2spl	Gridpoint to spectral (linear)	
Syntax	<operator> ifile ofile	

sp2sp	Spectral to spectral	
Syntax	sp2sp , <i>trunc</i> ifile ofile	

spcut	Cut spectral wave number	
Syntax	spcut , <i>wnums</i> ifile ofile	

dv2uv	Divergence and vorticity to U and V wind	
dv2uvl	Divergence and vorticity to U and V wind (linear)	
uv2dv	U and V wind to divergence and vorticity	
uv2dvl	U and V wind to divergence and vorticity (linear)	
Syntax	<operator> ifile ofile	

Formatted I/O

input	ASCII input	
Syntax	input , <i>grid</i> ofile	
inputsrv	SERVICE ASCII input	
inputext	EXTRA ASCII input	
Syntax	<operator> ofile	

output	ASCII output	
Syntax	output ifiles	

outputf	Formatted output	
Syntax	outputf , <i>format</i> , <i>nelem</i> ifiles	

outputint	Integer output	
outputsrv	SERVICE ASCII output	
outputext	EXTRA ASCII output	
Syntax	<operator> ifiles	

Miscellaneous

gridarea	Grid cell area	
gridweights	Grid cell weights	
Syntax	<operator> ifile ofile	

gradsdes1	GrADS data descriptor file (version 1 GRIB map)	
gradsdes2	GrADS data descriptor file (version 2 GRIB map)	
Syntax	<operator> ifile	

smooth9	9 point smoothing	
Syntax	smooth9 ifile ofile	

setrtoc	Set range to constant	
Syntax	setrtoc , <i>rmin</i> , <i>rmax</i> , <i>c</i> ifile ofile	

setrtoc2	Set range to constant others to constant2	
Syntax	setrtoc2 , <i>rmin</i> , <i>rmax</i> , <i>c</i> , <i>c2</i> ifile ofile	

timsort	Sort over the time	
Syntax	timsort ifile ofile	

const	Create a constant field	
Syntax	const , <i>const</i> , <i>grid</i> ofile	

random	Create a field with random values	
Syntax	random , <i>grid</i> ofile	

rotuvb	Backward rotation	
Syntax	rotuvb , <i>u</i> , <i>v</i> ,... ifile ofile	

mastrfu	Mass stream function	
Syntax	mastrfu ifile ofile	

histcount	Histogram count	
histsum	Histogram sum	
histmean	Histogram mean	
histfreq	Histogram frequency	
Syntax	<operator> , <i>bounds</i> ifile ofile	

wct	Windchill temperature	
Syntax	wct ifile1 ifile2 ofile	

fdns	Frost days where no snow index per time period	
Syntax	fdns ifile1 ifile2 ofile	

strwin	Strong wind days index per time period	
Syntax	strwin [, <i>v</i>] ifile ofile	

strbre	Strong breeze days index per time period	
Syntax	strbre ifile ofile	

strgal	Strong gale days index per time period	
Syntax	strgal ifile ofile	

hurr	Hurricane days index per time period	
Syntax	hurr ifile ofile	

import_amsr	Import AMSR binary files	
Syntax	import_amsr ifile ofile	

import_cmsaf	Import CM-SAF HDF5 files	
Syntax	import_cmsaf ifile ofile	

import_binary	Import binary data sets	
Syntax	import_binary ifile ofile	

Climate indices

		eca_tg90p Syntax	Warm days percent wrt 90th percentile of reference period eca_tg90p ifile1 ifile2 ofile
eca_cdd Syntax	Consecutive dry days index per time period eca_cdd ifile ofile	eca_tn10p Syntax	Cold nights percent wrt 10th percentile of reference period eca_tn10p ifile1 ifile2 ofile
eca_cfd Syntax	Consecutive frost days index per time period eca_cfd ifile ofile	eca_tn90p Syntax	Warm nights percent wrt 90th percentile of reference period eca_tn90p ifile1 ifile2 ofile
eca_csu Syntax	Consecutive summer days index per time period eca_csu[,T] ifile ofile	eca_tr Syntax	Tropical nights index per time period eca_tr[,T] ifile ofile
eca_cwd Syntax	Consecutive wet days index per time period eca_cwd ifile ofile	eca_tx10p Syntax	Very cold days percent wrt 10th percentile of reference period eca_tx10p ifile1 ifile2 ofile
eca_cwdi Syntax	Cold wave duration index wrt mean of reference period eca_cwdi[,nday[,T]] ifile1 ifile2 ofile	eca_tx90p Syntax	Very warm days percent wrt 90th percentile of reference period eca_tx90p ifile1 ifile2 ofile
eca_cwfi Syntax	Cold-spell days index wrt 10th percentile of reference period eca_cwfi[,nday] ifile1 ifile2 ofile		
eca_etr Syntax	Intra-period extreme temperature range eca_etr ifile1 ifile2 ofile		
eca_fd Syntax	Frost days index per time period eca_fd ifile ofile		
eca_gsl Syntax	Growing season length index eca_gsl[,nday[,T[,fland]]] ifile1 ifile2 ofile		
eca_hd Syntax	Heating degree days per time period eca_hd[,T1[,T2]] ifile ofile		
eca_hwdi Syntax	Heat wave duration index wrt mean of reference period eca_hwdi[,nday[,T]] ifile1 ifile2 ofile		
eca_hwfi Syntax	Warm spell days index wrt 90th percentile of reference period eca_hwfi[,nday] ifile1 ifile2 ofile		
eca_id Syntax	Ice days index per time period eca_id ifile ofile		
eca_r10mm Syntax	Heavy precipitation days index per time period eca_r10mm ifile ofile		
eca_r20mm Syntax	Very heavy precipitation days index per time period eca_r20mm ifile ofile		
eca_r75p Syntax	Moderate wet days wrt 75th percentile of reference period eca_r75p ifile1 ifile2 ofile		
eca_r75ptot Syntax	Precipitation percent due to R75p days eca_r75ptot ifile1 ifile2 ofile		
eca_r90p Syntax	Wet days wrt 90th percentile of reference period eca_r90p ifile1 ifile2 ofile		
eca_r90ptot Syntax	Precipitation percent due to R90p days eca_r90ptot ifile1 ifile2 ofile		
eca_r95p Syntax	Very wet days wrt 95th percentile of reference period eca_r95p ifile1 ifile2 ofile		
eca_r95ptot Syntax	Precipitation percent due to R95p days eca_r95ptot ifile1 ifile2 ofile		
eca_r99p Syntax	Extremely wet days wrt 99th percentile of reference period eca_r99p ifile1 ifile2 ofile		
eca_r99ptot Syntax	Precipitation percent due to R99p days eca_r99ptot ifile1 ifile2 ofile		
eca_rr1 Syntax	Wet days index per time period eca_rr1 ifile ofile		
eca_rx1day Syntax	Highest one day precipitation amount per time period eca_rx1day[,mode] ifile ofile		
eca_rx5day Syntax	Highest five-day precipitation amount per time period eca_rx5day[,x] ifile ofile		
eca_sdii Syntax	Simple daily intensity index per time period eca_sdii ifile ofile		
eca_su Syntax	Summer days index per time period eca_su[,T] ifile ofile		
eca_tg10p Syntax	Cold days percent wrt 10th percentile of reference period eca_tg10p ifile1 ifile2 ofile		