CDO Reference Card

Climate Data Operators
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Syntax

cdo [Options] Operators	

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, srv, ext, ieg; 1 - 32 for grb)
-f *<format>*	Output file format (grb, nc, nc2, 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
-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

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>* ifile
diff	Compare two datasets listed by code number
diffv	Compare two datasets listed by variable name
Syntax	*<operator>* ifile1 ifile2
ncode	Number of codes
nvar	Number of variables
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 codes
showvar	Show variable names
showstdname	Show standard names
showlevel	Show levels
showyear	Show years
showmon	Show months
showdate	Show dates
showtime	Show time steps
Syntax	*<operator>* ifile
vardes	Variable description
griddes	Grid 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 codes
splitvar	Split variables
splitlevel	Split levels
splitgrid	Split grids
splitzaxis	Split zaxis
splitrec	Split records
Syntax	*<operator>* ifile oprefix
splithour	Split hours
splitday	Split days
splitmon	Split months
splitseas	Split seasons
splityear	Split years
Syntax	*<operator>* ifile oprefix

Selection

selcode	Select codes
delcode	Delete codes
Syntax	*<operator>*,*codes* ifile ofile
selvar	Select variables
delvar	Delete variables
Syntax	*<operator>*,*vars* ifile ofile
selstdname	Select standard names
Syntax	**selstdname**,*stdnames* ifile ofile
sellevel	Select levels
Syntax	**sellevel**,*levels* ifile ofile
selgrid	Select grids
Syntax	**selgrid**,*grids* ifile ofile
selgridname	Select grids by name
Syntax	**selgridname**,*gridnames* ifile ofile
selzaxis	Select zaxes
Syntax	**selzaxis**,*zaxes* ifile ofile
selzaxisname	Select zaxes by name
Syntax	**selzaxisname**,*zaxisnames* ifile ofile
seltabnum	Select parameter table numbers
Syntax	**seltabnum**,*tabnums* ifile ofile
selrec	Select records
Syntax	**selrec**,*records* 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 then constant
gec	Greater equal constant
gtc	Greater then 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
setvar	Set variable name
Syntax	**setvar**,*name* ifile ofile
setlevel	Set level
Syntax	**setlevel**,*level* ifile ofile
setdate	Set date
Syntax	**setdate**,*date* ifile ofile
settime	Set time
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
settunits	Set time units
Syntax	**settunits**,*units* ifile ofile
settaxis	Set time axis
Syntax	**settaxis**,*date,time[,inc]* ifile ofile
setreftime	Set reference time
Syntax	**setreftime**,*date,time* 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
chvar	Change variable name
Syntax	**chvar**,*ovar,nvar,...* 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**,*var,oldlev,newlev* ifile ofile

setgrid / axis

setgrid	Set grid
Syntax	**setgrid**,*grid* ifile ofile
setgridtype	Set grid type
Syntax	**setgridtype**,*gridtype* ifile ofile
setzaxis	Set zaxis
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 latitude
invertlon	Invert longitude
invertlatdes	Invert latitude description
invertlondes	Invert longitude description
invertlatdata	Invert latitude data
invertlondata	Invert longitude data
Syntax	*<operator>* 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**,*miss* 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
Syntax	**setrtomiss**,*rmin,rmax* ifile ofile

Arithmetic

expr	Evaluate expressions
Syntax	**expr**,*instr* ifile ofile
exprf	Evaluate expressions from script file
Syntax	**exprf**,*filename* ifile ofile
abs	Absolute value
int	Integer value
nint	Nearest integer value
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
atan	Arc tangent
Syntax	*<operator>* ifile ofile
addc	Add a constant
subc	Subtract a constant
mulc	Multiply with a constant
divc	Divide by a constant
Syntax	*<operator>*,*c* 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

Column 1

ymonadd	Add multi-year monthly time average
ymonsub	Subtract multi-year monthly time average
ymonmul	Multiply multi-year monthly time average
ymondiv	Divide multi-year monthly time average
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

ensmin	Ensemble minimum
ensmax	Ensemble maximum
enssum	Ensemble sum
ensmean	Ensemble mean
ensavg	Ensemble average
ensvar	Ensemble variance
ensstd	Ensemble standard deviation
Syntax	*\<operator\>* ifiles ofile
enspctl	Ensemble percentiles
Syntax	**enspctl**,*p* ifiles ofile

fldmin	Field minimum
fldmax	Field maximum
fldsum	Field sum
fldmean	Field mean
fldavg	Field average
fldvar	Field variance
fldstd	Field standard deviation
Syntax	*\<operator\>* ifile ofile
fldpctl	Field percentiles
Syntax	**fldpctl**,*p* ifile ofile

zonmin	Zonal minimum
zonmax	Zonal maximum
zonsum	Zonal sum
zonmean	Zonal mean
zonavg	Zonal average
zonvar	Zonal variance
zonstd	Zonal standard deviation
Syntax	*\<operator\>* ifile ofile
zonpctl	Zonal percentiles
Syntax	**zonpctl**,*p* ifile ofile

mermin	Meridional minimum
mermax	Meridional maximum
mersum	Meridional sum
mermean	Meridional mean
meravg	Meridional average
mervar	Meridional variance
merstd	Meridional standard deviation
Syntax	*\<operator\>* ifile ofile
merpctl	Meridional percentiles
Syntax	**merpctl**,*p* ifile ofile

vertmin	Vertical minimum
vertmax	Vertical maximum
vertsum	Vertical sum
vertmean	Vertical mean
vertavg	Vertical average
vertvar	Vertical variance
vertstd	Vertical standard deviation
Syntax	*\<operator\>* ifile ofile

selmin	Time range minimum
selmax	Time range maximum
selsum	Time range sum
selmean	Time range mean
selavg	Time range average
selvar	Time range variance
selstd	Time range standard deviation
Syntax	*\<operator\>*,*nsets[,noffset[,nskip]]* ifile ofile
selpctl	Time range percentiles
Syntax	**selpctl**,*p,nsets[,noffset[,nskip]]* in1 in2 in3 out

Column 2

runmin	Running minimum
runmax	Running maximum
runsum	Running sum
runmean	Running mean
runavg	Running average
runvar	Running variance
runstd	Running standard deviation
Syntax	*\<operator\>*,*nts* ifile ofile
runpctl	Running percentiles
Syntax	**runpctl**,*p,nts* ifile1 ofile

timmin	Time minimum
timmax	Time maximum
timsum	Time sum
timmean	Time mean
timavg	Time average
timvar	Time variance
timstd	Time standard deviation
Syntax	*\<operator\>* ifile ofile
timpctl	Time percentiles
Syntax	**timpctl**,*p* ifile1 ifile2 ifile3 ofile

hourmin	Hourly minimum
hourmax	Hourly maximum
hoursum	Hourly sum
hourmean	Hourly mean
houravg	Hourly average
hourvar	Hourly variance
hourstd	Hourly standard deviation
Syntax	*\<operator\>* ifile ofile
hourpctl	Hourly percentiles
Syntax	**hourpctl**,*p* ifile1 ifile2 ifile3 ofile

daymin	Daily minimum
daymax	Daily maximum
daysum	Daily sum
daymean	Daily mean
dayavg	Daily average
dayvar	Daily variance
daystd	Daily standard deviation
Syntax	*\<operator\>* ifile ofile
daypctl	Daily percentiles
Syntax	**daypctl**,*p* ifile1 ifile2 ifile3 ofile

monmin	Monthly minimum
monmax	Monthly maximum
monsum	Monthly sum
monmean	Monthly mean
monavg	Monthly average
monvar	Monthly variance
monstd	Monthly standard deviation
Syntax	*\<operator\>* ifile ofile
monpctl	Monthly percentiles
Syntax	**monpctl**,*p* ifile1 ifile2 ifile3 ofile

yearmin	Yearly minimum
yearmax	Yearly maximum
yearsum	Yearly sum
yearmean	Yearly mean
yearavg	Yearly average
yearvar	Yearly variance
yearstd	Yearly standard deviation
Syntax	*\<operator\>* ifile ofile
yearpctl	Yearly percentiles
Syntax	**yearpctl**,*p* ifile1 ifile2 ifile3 ofile

Column 3

seasmin	Seasonal minimum
seasmax	Seasonal maximum
seassum	Seasonal sum
seasmean	Seasonal mean
seasavg	Seasonal average
seasvar	Seasonal variance
seasstd	Seasonal standard deviation
Syntax	*\<operator\>* ifile ofile
seaspctl	Seasonal percentiles
Syntax	**seaspctl**,*p* ifile1 ifile2 ifile3 ofile

ydaymin	Multi-year daily minimum
ydaymax	Multi-year daily maximum
ydaysum	Multi-year daily sum
ydaymean	Multi-year daily mean
ydayavg	Multi-year daily average
ydayvar	Multi-year daily variance
ydaystd	Multi-year daily standard deviation
Syntax	*\<operator\>* ifile ofile
ydaypctl	Multi-year daily percentiles
Syntax	**ydaypctl**,*p* ifile1 ifile2 ifile3 ofile

ymonmin	Multi-year monthly minimum
ymonmax	Multi-year monthly maximum
ymonsum	Multi-year monthly sum
ymonmean	Multi-year monthly mean
ymonavg	Multi-year monthly average
ymonvar	Multi-year monthly variance
ymonstd	Multi-year monthly standard deviation
Syntax	*\<operator\>* ifile ofile
ymonpctl	Multi-year monthly percentiles
Syntax	**ymonpctl**,*p* ifile1 ifile2 ifile3 ofile

yseasmin	Multi-year seasonal minimum
yseasmax	Multi-year seasonal maximum
yseassum	Multi-year seasonal sum
yseasmean	Multi-year seasonal mean
yseasavg	Multi-year seasonal average
yseasvar	Multi-year seasonal variance
yseasstd	Multi-year seasonal standard deviation
Syntax	*\<operator\>* ifile ofile
yseaspctl	Multi-year seasonal percentiles
Syntax	**yseaspctl**,*p* ifile1 ifile2 ifile3 ofile

ydrunmin	Multi-year daily running minimum
ydrunmax	Multi-year daily running maximum
ydrunsum	Multi-year daily running sum
ydrunmean	Multi-year daily running mean
ydrunavg	Multi-year daily running average
ydrunvar	Multi-year daily running variance
ydrunstd	Multi-year daily running standard deviation
Syntax	*\<operator\>*,*nts* ifile ofile
ydrunpctl	Multi-year daily running percentiles
Syntax	**ydrunpctl**,*p,nts* ifile1 ifile2 ifile3 ofile

Regression

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
remapcon	Conservative remapping
remapdis	Distance-weighted averaging
Syntax	*\<operator\>*,*grid* ifile ofile

Column 4

genbil	Generate bilinear interpolation weights
genbic	Generate bicubic interpolation weights
gencon	Generate conservative interpolation weights
gendis	Generate distance-weighted averaging weights
Syntax	*\<operator\>*,*grid* ifile ofile

remap	SCRIP grid remapping
Syntax	**remap**,*grid,weights* ifile ofile

interpolate	PINGO grid interpolation
intgridbil	Bilinear grid interpolation
Syntax	*\<operator\>*,*grid* ifile ofile

ml2pl	Model to pressure level interpolation
Syntax	**ml2pl**,*plevels* ifile ofile
ml2hl	Model to height level interpolation
Syntax	**ml2hl**,*hlevels* ifile ofile

inttime	Time interpolation
Syntax	**inttime**,*date,time[,inc]* ifile ofile
intntime	Time interpolation
Syntax	**intntime**,*n* ifile ofile
intyear	Year interpolation
Syntax	**intyear**,*years* ifile1 ifile2 oprefix

Transformation

sp2gp	Spectral to gridpoint
sp2gpl	Spectral to gridpoint linear
gp2sp	Gridpoint to spectral
gp2spl	Gridpoint to spectral linear
Syntax	*\<operator\>* ifile ofile
sp2sp	Spectral to spectral
Syntax	**sp2sp**,*trunc* ifile ofile

uv2dv	U and V wind to divergence and vorticity
dv2uv	Divergence and vorticity to U and V wind
Syntax	*\<operator\>* ifile ofile

Formatted I/O

input	ASCII input
Syntax	**input**,*grid* ofile
inputsrv	SERVICE input
inputext	EXTRA input
Syntax	*\<operator\>* ofile

output	ASCII output
Syntax	**output** ifiles
outputf	Formatted output
Syntax	**outputf**,*format,nelem* ifiles
outputint	Integer output
outputsrv	SERVICE output
outputext	EXTRA output
Syntax	*\<operator\>* ifiles

Miscellaneous

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

timsort	Sort over the time
Syntax	**timsort** ifile ofile

const	Create a constant field
Syntax	**const**,*const,grid* ofile
random	Create a field with random values
Syntax	**random**,*grid* ofile

vardup	Duplicate variables
Syntax	**vardup** ifile ofile
varmul	Multiply variables
Syntax	**varmul**,*nmul* ifile ofile

rotuvb	Backward rotation
Syntax	**rotuvb**,*u,v,...* ifile ofile

mastrfu	Mass stream function
Syntax	**mastrfu** `ifile ofile`

hi	Humidity index (C)
Syntax	**hi** `ifile1 ifile2 ifile3 ofile`

wct	Windchill temperature (C)
Syntax	**wct** `ifile1 ifile2 ofile`

ECA indices

eca_cdd	Consecutive dry days index per time period
Syntax	**eca_cdd** `ifile ofile`

eca_cfd	Consecutive frost days index per time period
Syntax	**eca_cfd** `ifile ofile`

eca_csu	Consecutive summer days index per time period
Syntax	**eca_csu***[,T]* `ifile ofile`

eca_cwd	Consecutive wet days index per time period
Syntax	**eca_cwd** `ifile ofile`

eca_cwdi	Cold wave duration index wrt mean of reference period
Syntax	**eca_cwdi***[,nday[,T]]* `ifile1 ifile2 ofile`

eca_cwfi	Cold-spell days index wrt 10th percentile of reference period
Syntax	**eca_cwfi***[,nday]* `ifile1 ifile2 ofile`

eca_etr	Intra-period extreme temperature range
Syntax	**eca_etr** `ifile1 ifile2 ofile`

eca_fd	Frost days index per time period
Syntax	**eca_fd** `ifile ofile`

eca_fdns	Frost days where no snow index per time period
Syntax	**eca_fdns** `ifile1 ifile2 ofile`

eca_gsl	Growing season length index
Syntax	**eca_gsl***[,nday[,T]]* `ifile ofile`

eca_hd	Heating degree days per time period
Syntax	**eca_hd***[,T1[,T2]]* `ifile ofile`

eca_hwdi	Heat wave duration index wrt mean of reference period
Syntax	**eca_hwdi***[,nday[,T]]* `ifile1 ifile2 ofile`

eca_hwfi	Warm spell days index wrt 90th percentile of reference period
Syntax	**eca_hwfi***[,nday]* `ifile1 ifile2 ofile`

eca_id	Ice days index per time period
Syntax	**eca_id** `ifile ofile`

eca_r10mm	Heavy precipitation days index per time period
Syntax	**eca_r10mm** `ifile ofile`

eca_r20mm	Very heavy precipitation days index per time period
Syntax	**eca_r20mm** `ifile ofile`

eca_r75p	Moderate wet days wrt 75th percentile of reference period
Syntax	**eca_r75p** `ifile1 ifile2 ofile`

eca_r75ptot	Precipitation percent due to R75p days
Syntax	**eca_r75ptot** `ifile1 ifile2 ofile`

eca_r90p	Wet days wrt 90th percentile of reference period
Syntax	**eca_r90p** `ifile1 ifile2 ofile`

eca_r90ptot	Precipitation percent due to R90p days
Syntax	**eca_r90ptot** `ifile1 ifile2 ofile`

eca_r95p	Very wet days wrt 95th percentile of reference period
Syntax	**eca_r95p** `ifile1 ifile2 ofile`

eca_r95ptot	Precipitation percent due to R95p days
Syntax	**eca_r95ptot** `ifile1 ifile2 ofile`

eca_r99p	Extremely wet days wrt 99th percentile of reference period
Syntax	**eca_r99p** `ifile1 ifile2 ofile`

eca_r99ptot	Precipitation percent due to R99p days
Syntax	**eca_r99ptot** `ifile1 ifile2 ofile`

eca_rr1	Wet days index per time period
Syntax	**eca_rr1** `ifile ofile`

eca_rx1day	Highest one day precipitation amount per time period
Syntax	**eca_rx1day***[,mode]* `ifile ofile`

eca_rx5day	Highest five-day precipitation amount per time period
Syntax	**eca_rx5day***[,x]* `ifile ofile`

eca_sdii	Simple daily intensity index per time period
Syntax	**eca_sdii** `ifile ofile`

eca_strwin	Strong wind days index per time period
Syntax	**eca_strwin***[,v]* `ifile ofile`

eca_strbre	Strong breeze days index per time period
Syntax	**eca_strbre** `ifile ofile`

eca_strgal	Strong gale days index per time period
Syntax	**eca_strgal** `ifile ofile`

eca_hurr	Hurricane days index per time period
Syntax	**eca_hurr** `ifile ofile`

eca_su	Summer days index per time period
Syntax	**eca_su***[,T]* `ifile ofile`

eca_tg10p	Cold days percent wrt 10th percentile of reference period
Syntax	**eca_tg10p** `ifile1 ifile2 ofile`

eca_tg90p	Warm days percent wrt 90th percentile of reference period
Syntax	**eca_tg90p** `ifile1 ifile2 ofile`

eca_tn10p	Cold nights percent wrt 10th percentile of reference period
Syntax	**eca_tn10p** `ifile1 ifile2 ofile`

eca_tn90p	Warm nights percent wrt 90th percentile of reference period
Syntax	**eca_tn90p** `ifile1 ifile2 ofile`

eca_tr	Tropical nights index per time period
Syntax	**eca_tr***[,T]* `ifile ofile`

eca_tx10p	Very cold days percent wrt 10th percentile of reference period
Syntax	**eca_tx10p** `ifile1 ifile2 ofile`

eca_tx90p	Very warm days percent wrt 90th percentile of reference period
Syntax	**eca_tx90p** `ifile1 ifile2 ofile`