

CDO Reference Card

Climate Data Operators
Version 1.0.7
March 2007
Uwe Schulzweida
Max-Planck-Institute for Meteorology

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 infov map	Dataset information listed by code number Dataset information listed by variable name Dataset information and simple map
Syntax	<operator> ifiles
sinfo sinfov	Short dataset information listed by code number Short dataset information listed by variable name
Syntax	<operator> ifile
diff diffv	Compare two datasets listed by code number Compare two datasets listed by variable name
Syntax	<operator> ifile1 ifile2

ncode nvar nlevel nyear nmon ndate ntime	Number of codes Number of variables Number of levels Number of years Number of months Number of dates Number of time steps
Syntax	<operator> ifile
showformat showcode showvar showstdname showlevel showyear showmon showdate showtime	Show file format Show codes Show variable names Show standard names Show levels Show years Show months Show dates Show time steps
Syntax	<operator> ifile
vardes griddes vct	Variable description Grid description Vertical coordinate table
Syntax	<operator> ifile

File operations

copy cat	Copy datasets Concatenate datasets
Syntax	<operator> ifiles ofile
replace	Replace variables
Syntax	replace ifile1 ifile2 ofile
merge mergetime	Merge datasets with different fields Merge datasets sorted by date and time
Syntax	<operator> ifiles ofile
splitcode splitvar splitlevel splitgrid splitzaxis splitrec	Split codes Split variables Split levels Split grids Split zaxis Split records
Syntax	<operator> ifile oprefix
splithour splitday splitmon splitseas splityear	Split hours Split days Split months Split seasons Split years
Syntax	<operator> ifile oprefix

Selection

selcode delcode	Select codes Delete codes
Syntax	<operator>,codes ifile ofile
selvar delvar	Select variables 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

selimestep	Select time steps
Syntax	selimestep,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 ifnotthen	If then If not then
Syntax	<operator> ifile1 ifile2 ofile
ifthenelse	If then else
Syntax	ifthenelse ifile1 ifile2 ifile3 ofile
ifthenc ifnotthenc	If then constant If not then constant
Syntax	<operator>,.c ifile ofile

Comparison

eq ne le lt ge gt	Equal Not equal Less equal Less than Greater equal Greater than
Syntax	<operator> ifile1 ifile2 ofile
eqc nec lec ltc gec gtc	Equal constant Not equal constant Less equal constant Less then constant Greater equal constant 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
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 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	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 invertlon invertlatdes invertlonides invertlatdata invertlondata	Invert latitude Invert longitude Invert latitude description Invert longitude description Invert latitude data 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 setmisstoc	Set constant to missing value 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 int nint sqr sqrt exp ln log10 sin cos tan asin acos atan	Absolute value Integer value Nearest integer value Square Square root Exponential Natural logarithm Base 10 logarithm Sine Cosine Tangent Arc sine Arc cosine Arc tangent
Syntax	<operator> ifile ofile
addc subc mulc divc	Add a constant Subtract a constant Multiply with a constant Divide by a constant
Syntax	<operator>,.c ifile ofile
add sub mul div min max atan2	Add two fields Subtract two fields Multiply two fields Divide two fields Minimum of two fields Maximum of two fields Arc tangent of two fields
Syntax	<operator> ifile1 ifile2 ofile

y monadd	Add multi-year monthly time average
y monsub	Subtract multi-year monthly time average
y monmul	Multiply multi-year monthly time average
y monddiv	Divide multi-year monthly time average
Syntax	<operator> ifile1 ifile2 ofile
mul dpm	Multiply with days per month
div dpm	Divide by days per month
mul dpy	Multiply with days per year
div dpy	Divide by days per year
Syntax	<operator> ifile ofile

Statistical values

en smin	Ensemble minimum
en smax	Ensemble maximum
en ssum	Ensemble sum
en smean	Ensemble mean
en savg	Ensemble average
en svar	Ensemble variance
en sstd	Ensemble standard deviation
Syntax	<operator> ifiles ofile
en spctl	Ensemble percentiles
Syntax	enspctl,p ifiles ofile

fld min	Field minimum
fld max	Field maximum
fld sum	Field sum
fld mean	Field mean
fld avg	Field average
fld var	Field variance
fld std	Field standard deviation
Syntax	<operator> ifile ofile
fld pctl	Field percentiles
Syntax	fldpctl,p ifile ofile

zon min	Zonal minimum
zon max	Zonal maximum
zon sum	Zonal sum
zon mean	Zonal mean
zon avg	Zonal average
zon var	Zonal variance
zon std	Zonal standard deviation
Syntax	<operator> ifile ofile
zon pctl	Zonal percentiles
Syntax	zonpctl,p ifile ofile

mer min	Meridional minimum
mer max	Meridional maximum
mer sum	Meridional sum
mer mean	Meridional mean
mer avg	Meridional average
mer var	Meridional variance
mer std	Meridional standard deviation
Syntax	<operator> ifile ofile
mer pctl	Meridional percentiles
Syntax	merpctl,p ifile ofile

vert min	Vertical minimum
vert max	Vertical maximum
vert sum	Vertical sum
vert mean	Vertical mean
vert avg	Vertical average
vert var	Vertical variance
vert std	Vertical standard deviation
Syntax	<operator> ifile ofile

sel min	Time range minimum
sel max	Time range maximum
sel sum	Time range sum
sel mean	Time range mean
sel avg	Time range average
sel var	Time range variance
sel std	Time range standard deviation
Syntax	<operator>,nsets[,noffset[,nskip]] ifile ofile

sel pctl	Time range percentiles
Syntax	selpctl,p,nsets[,noffset[,nskip]] in1 in2 in3 out

run min	Running minimum
run max	Running maximum
run sum	Running sum
run mean	Running mean
run avg	Running average
run var	Running variance
run std	Running standard deviation
Syntax	<operator>,nts ifile ofile

run pctl	Running percentiles
Syntax	runpctl,p,nts ifile1 ofile

tim min	Time minimum
tim max	Time maximum
tim sum	Time sum
tim mean	Time mean
tim avg	Time average
tim var	Time variance
tim std	Time standard deviation
Syntax	<operator> ifile ofile

tim pctl	Time percentiles
Syntax	timpctl,p ifile1 ifile2 ifile3 ofile

hour min	Hourly minimum
hour max	Hourly maximum
hour sum	Hourly sum
hour mean	Hourly mean
hour avg	Hourly average
hour var	Hourly variance
hour std	Hourly standard deviation
Syntax	<operator> ifile ofile

hour pctl	Hourly percentiles
Syntax	hourpctl,p ifile1 ifile2 ifile3 ofile

day min	Daily minimum
day max	Daily maximum
day sum	Daily sum
day mean	Daily mean
day avg	Daily average
day var	Daily variance
day std	Daily standard deviation
Syntax	<operator> ifile ofile

day pctl	Daily percentiles
Syntax	daypctl,p ifile1 ifile2 ifile3 ofile

mon min	Monthly minimum
mon max	Monthly maximum
mon sum	Monthly sum
mon mean	Monthly mean
mon avg	Monthly average
mon var	Monthly variance
mon std	Monthly standard deviation
Syntax	<operator> ifile ofile

mon pctl	Monthly percentiles
Syntax	monpctl,p ifile1 ifile2 ifile3 ofile

year min	Yearly minimum
year max	Yearly maximum
year sum	Yearly sum
year mean	Yearly mean
year avg	Yearly average
year var	Yearly variance
year std	Yearly standard deviation
Syntax	<operator> ifile ofile

year pctl	Yearly percentiles
Syntax	yearpctl,p ifile1 ifile2 ifile3 ofile

seas min	Seasonal minimum
seas max	Seasonal maximum
seas sum	Seasonal sum
seas mean	Seasonal mean
seas avg	Seasonal average
seas var	Seasonal variance
seas std	Seasonal standard deviation
Syntax	<operator> ifile ofile

seas pctl	Seasonal percentiles
Syntax	seaspctl,p ifile1 ifile2 ifile3 ofile

y daymin	Multi-year daily minimum
y daymax	Multi-year daily maximum
y daysum	Multi-year daily sum
y daymean	Multi-year daily mean
y dayavg	Multi-year daily average
y dayvar	Multi-year daily variance
y daystd	Multi-year daily standard deviation
Syntax	<operator> ifile ofile

y daypctl	Multi-year daily percentiles
Syntax	ydaypctl,p ifile1 ifile2 ifile3 ofile

y monmin	Multi-year monthly minimum
y monmax	Multi-year monthly maximum
y monsum	Multi-year monthly sum
y monmean	Multi-year monthly mean
y monavg	Multi-year monthly average
y monvar	Multi-year monthly variance
y monstd	Multi-year monthly standard deviation
Syntax	<operator> ifile ofile

y monpctl	Multi-year monthly percentiles
Syntax	ymonpctl,p ifile1 ifile2 ifile3 ofile

y seasmin	Multi-year seasonal minimum
y seasmax	Multi-year seasonal maximum
y seassum	Multi-year seasonal sum
y seasmean	Multi-year seasonal mean
y seasavg	Multi-year seasonal average
y seasvar	Multi-year seasonal variance
y seasstd	Multi-year seasonal standard deviation
Syntax	<operator> ifile ofile

y seaspctl	Multi-year seasonal percentiles
Syntax	yseaspctl,p ifile1 ifile2 ifile3 ofile

y drunmin	Multi-year daily running minimum
y drunmax	Multi-year daily running maximum
y drunsum	Multi-year daily running sum
y drunmean	Multi-year daily running mean
y drunavg	Multi-year daily running average
y drunvar	Multi-year daily running variance
y drunstd	Multi-year daily running standard deviation
Syntax	<operator>,nts ifile ofile

y drunpctl	Multi-year daily running percentiles
Syntax	ydrunpctl,p,nts ifile1 ifile2 ifile3 ofile

Regression

det trend	Detrend
Syntax	detrend ifile ofile

t rend	Trend
Syntax	trend ifile ofile1 ofile2

sub trend	Subtract trend
Syntax	subtrend ifile1 ifile2 ifile3 ofile

Interpolation

re mapbil	Bilinear interpolation
re mapbic	Bicubic interpolation
re mapcon	Conservative remapping
re mapdis	Distance-weighted averaging
Syntax	<operator>,grid ifile ofile

gen bil	Generate bilinear interpolation weights
gen bic	Generate bicubic interpolation weights
gen con	Generate conservative interpolation weights
gen dis	Generate distance-weighted averaging weights
Syntax	<operator>,grid ifile ofile

re map	SCRIP grid remapping
Syntax	remap,grid,weights ifile ofile

inter polate	PINGO grid interpolation
int gridbil	Bilinear grid interpolation
Syntax	<operator>,grid ifile ofile

ml 2pl	Model to pressure level interpolation
Syntax	ml2pl,plevels ifile ofile

ml 2hl	Model to height level interpolation
Syntax	ml2hl,hlevels ifile ofile

int time	Time interpolation
Syntax	inttime,date,time[,inc] ifile ofile

int ntime	Time interpolation
Syntax	intntime,n ifile ofile

int year	Year interpolation
Syntax	intyear,years ifile1 ifile2 oprefix

Transformation

sp 2gp	Spectral to gridpoint
sp 2gpl	Spectral to gridpoint (linear)
gp 2sp	Gridpoint to spectral
gp 2spl	Gridpoint to spectral (linear)
Syntax	<operator> ifile ofile
sp 2sp	Spectral to spectral
Syntax	sp2sp,trunc ifile ofile

dv 2uv	Divergence and vorticity to U and V wind
dv 2uvl	Divergence and vorticity to U and V wind (linear)
uv 2dv	U and V wind to divergence and vorticity
uv 2dvl	U and V wind to divergence and vorticity (linear)
Syntax	<operator> ifile ofile

Formatted I/O

in put	ASCII input
Syntax	input,grid ofile
in putsrv	SERVICE input
in putext	EXTRA input
Syntax	<operator> ofile

ou tput	ASCII output
Syntax	output ifiles
ou tputf	Formatted output
Syntax	outputf,format,nelem ifiles
ou tputint	Integer output
ou tputsrv	SERVICE output
ou tputext	EXTRA output
Syntax	<operator> ifiles

Miscellaneous

grad sdes1	GrADS data descriptor file (version 1 GRIB map)
grad sdes2	GrADS data descriptor file (version 2 GRIB map)
Syntax	<operator> ifile

tim sort	Sort over the time
Syntax	timsort ifile ofile

con st	Create a constant field
Syntax	const,const,grid ofile
ran dom	Create a field with random values
Syntax	random,grid ofile

var dup	Duplicate variables
Syntax	vardup ifile ofile

var mul	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