

CDO Reference Card

Climate Data Operators
Version 1.0.8
June 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	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
npar	Number of parameters
nlevel	Number of levels
year	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
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 zaxis
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>,vars ifile ofile
selstdname	Select variables by standard name
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
seltype	Select GRIB level types
Syntax	seltype,ltypes 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
seleas	Select seasons
Syntax	seleas,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
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
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
chname	Change variable name
Syntax	chname,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	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

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,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
sqr	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
ymonadd	Add multi-year monthly time average
ymonsul	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> >files 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
timselmin	Time range minimum
timselmax	Time range maximum
timselsum	Time range sum
timselmean	Time range mean
timselavg	Time range average
timselvar	Time range variance
timselstd	Time range standard deviation
Syntax	<operator> ,nsets[,noffset[,nskip]] ifile ofile
timselpctl	Time range percentiles
Syntax	timselpctl,p,nsets[,noffset[,nskip]] ifile1 ifile2 ifile3 ofile
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
tisum	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
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
remapbil	Bilinear interpolation
remapbic	Bicubic interpolation
remapcon	Conservative remapping
remapdis	Distance-weighted averaging
Syntax	<operator> ,grid ifile ofile
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
remapeta	Remap vertical hybrid level
Syntax	remapeta,vct[,oro] 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
spcut	Cut spectral wave number
Syntax	spcut,wnums 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,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
smooth9	9 point smoothing
Syntax	smooth9 ifile ofile
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
rotuvb	Backward rotation
Syntax	rotuvb,u,v,... ifile ofile
mastrfu	Mass stream function
Syntax	mastrfu ifile ofile
histcount	Histogram count
histsum	Histogram sum
histmean	Histogram mean
histfreq	Histogram frequency
Syntax	<operator>,bins ifile ofile
wct	Windchill temperature (C)
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[,v] 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

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_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_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