

CDO Reference Card

Climate Data Operators Version 1.0.9 September 2007
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Syntax

cdo	[Options]	Operators
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Options

-a	Convert from a relative to an absolute time axis
-b <i><nbits></i>	Set the number of bits for the output precision (32/64 for nc, nc2, srv, ext, ieg; 1 - 32 for grb)
-f <i><format></i>	Output file format (grb, nc, nc2, srv, ext, ieg)
-g <i><grid></i>	Grid name or file Available grids: t<RES>grid, r<NX>x<NY>
-h	Help information for the operators
-m <i><missval></i>	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 <i><table></i>	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
npar nlevel nyear nmon ndate ntime	Number of parameters Number of levels Number of years Number of months Number of dates Number of time steps
Syntax	<operator> ifile
showformat showcode showname showstdname showlevel showtype showyear showmon showdate showtime	Show file format Show code numbers Show variable names Show standard names Show levels Show GRIB level types Show years Show months Show dates Show time steps
Syntax	<operator> ifile
pardes griddes vct	Parameter 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 splitname splitlevel splitgrid splitzaxis	Split code numbers Split variable names Split levels Split grids Split zaxis
Syntax	<operator> ifile oprefix
splithour splitday splitmon splitseas splityear	Split hours Split days Split months Split seasons Split years
Syntax	<operator> ifile oprefix
splitsel	Split time selection
Syntax	splitsel,nsets[,noffset[,nskip]] ifile oprefix

Selection

selcode delcode	Select variables by code number Delete variables by code number
Syntax	<operator> ,codes ifile ofile
selname delname	Select variables by name 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,types ifile ofile
seltabnum	Select parameter table numbers
Syntax	seltabnum,tabnums 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
selmon	Select single month
Syntax	selmon,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 ifnothenc	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
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 invertlon invertlatdes invertlondes invertlatdata invertlondata	Invert latitude Invert longitude Invert latitude description Invert longitude description Invert latitude data 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 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	Add a constant
subc	Subtract a constant
mulc	Multiply with a constant
divc	Divide by a constant
Syntax	<i><operator></i> , <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	<i><operator></i> ifile1 ifile2 ofile
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	<i><operator></i> 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	<i><operator></i> ifile ofile

Statistical values

Available statistical functions <i><STAT></i>	
minimum	min
maximum	max
sum	sum
mean	mean
average	avg
variance	var
standard deviation	std

ens <i><STAT></i>	Statistical values over an ensemble
Syntax	<i><operator></i> ifiles ofile
enspctl	Ensemble percentiles
Syntax	enspctl , <i>p</i> ifiles ofile
fld <i><STAT></i>	Statistical values over a field
Syntax	<i><operator></i> ifile ofile
fldpctl	Field percentiles
Syntax	fldpctl , <i>p</i> ifile ofile
zon <i><STAT></i>	Zonal statistical values
Syntax	<i><operator></i> ifile ofile
zonpctl	Zonal percentiles
Syntax	zonpctl , <i>p</i> ifile ofile
mer <i><STAT></i>	Meridional statistical values
Syntax	<i><operator></i> ifile ofile
merpctl	Meridional percentiles
Syntax	merpctl , <i>p</i> ifile ofile
vert <i><STAT></i>	Vertical statistical values
Syntax	<i><operator></i> ifile ofile
timsel <i><STAT></i>	Time range statistical values
Syntax	<i><operator></i> , <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 <i><STAT></i>	Running statistical values
Syntax	<i><operator></i> , <i>nts</i> ifile ofile
runpctl	Running percentiles
Syntax	runpctl , <i>p</i> , <i>nts</i> ifile1 ofile
tim <i><STAT></i>	Statistical values over all time steps
Syntax	<i><operator></i> ifile ofile
timpctl	Time percentiles
Syntax	timpctl , <i>p</i> ifile1 ifile2 ifile3 ofile
hour <i><STAT></i>	Hourly statistical values
Syntax	<i><operator></i> ifile ofile

hourpctl	Hourly percentiles
Syntax	hourpctl , <i>p</i> ifile1 ifile2 ifile3 ofile
day <i><STAT></i>	Daily statistical values
Syntax	<i><operator></i> ifile ofile
daypctl	Daily percentiles
Syntax	daypctl , <i>p</i> ifile1 ifile2 ifile3 ofile
mon <i><STAT></i>	Monthly statistical values
Syntax	<i><operator></i> ifile ofile
monpctl	Monthly percentiles
Syntax	monpctl , <i>p</i> ifile1 ifile2 ifile3 ofile
year <i><STAT></i>	Yearly statistical values
Syntax	<i><operator></i> ifile ofile
yearpctl	Yearly percentiles
Syntax	yearpctl , <i>p</i> ifile1 ifile2 ifile3 ofile
seas <i><STAT></i>	Seasonal statistical values
Syntax	<i><operator></i> ifile ofile
seaspctl	Seasonal percentiles
Syntax	seaspctl , <i>p</i> ifile1 ifile2 ifile3 ofile
yhour <i><STAT></i>	Multi-year hourly statistical values
Syntax	<i><operator></i> ifile ofile
yday <i><STAT></i>	Multi-year daily statistical values
Syntax	<i><operator></i> ifile ofile
ydaypctl	Multi-year daily percentiles
Syntax	ydaypctl , <i>p</i> ifile1 ifile2 ifile3 ofile
ymon <i><STAT></i>	Multi-year monthly statistical values
Syntax	<i><operator></i> ifile ofile
ymonpctl	Multi-year monthly percentiles
Syntax	ymonpctl , <i>p</i> ifile1 ifile2 ifile3 ofile
yseas <i><STAT></i>	Multi-year seasonal statistical values
Syntax	<i><operator></i> ifile ofile
yseaspctl	Multi-year seasonal percentiles
Syntax	yseaspctl , <i>p</i> ifile1 ifile2 ifile3 ofile
ydrun <i><STAT></i>	Multi-year daily running statistical values
Syntax	<i><operator></i> , <i>nts</i> ifile ofile
ydrunpctl	Multi-year daily running percentiles
Syntax	ydrunpctl , <i>p</i> , <i>nts</i> 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	<i><operator></i> , <i>grid</i> ifile ofile
genbil	Generate bilinear interpolation weights
genbic	Generate bicubic interpolation weights
gencon	Generate conservative interpolation weights
gendis	Generate distance-weighted averaging weights
Syntax	<i><operator></i> , <i>grid</i> ifile ofile
remap	SCRIP grid remapping
Syntax	remap , <i>grid</i> , <i>weights</i> ifile ofile
interpolate	PINGO grid interpolation
intgridbil	Bilinear grid interpolation
Syntax	<i><operator></i> , <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
inttime	Time interpolation
Syntax	inttime , <i>date</i> , <i>time</i> [<i>,inc</i>] ifile ofile
intntime	Time interpolation
Syntax	intntime , <i>n</i> ifile ofile
intyear	Year interpolation
Syntax	intyear , <i>years</i> ifile1 ifile2 oprefix

Transformation

sp2gp	Spectral to gridpoint
sp2gpl	Spectral to gridpoint (linear)
gp2sp	Gridpoint to spectral
gp2spl	Gridpoint to spectral (linear)
Syntax	<i><operator></i> ifile ofile
sp2sp	Spectral to spectral
Syntax	sp2sp , <i>truncate</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	<i><operator></i> ifile ofile

Formatted I/O

input	ASCII input
Syntax	input , <i>grid</i> ofile
inputsrv	SERVICE input
inputtext	EXTRA input
Syntax	<i><operator></i> ofile
output	ASCII output
Syntax	output ifiles
outputf	Formatted output
Syntax	outputf , <i>format</i> , <i>nelem</i> ifiles
outputint	Integer output
outputsrv	SERVICE output
outputext	EXTRA output
Syntax	<i><operator></i> ifiles

Miscellaneous

gradsdes1	GrADS data descriptor file (version 1 GRIB map)
gradsdes2	GrADS data descriptor file (version 2 GRIB map)
Syntax	<i><operator></i> 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	<i><operator></i> , <i>bins</i> 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 [<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

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 [<i>,T</i>] 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 [<i>,nday</i>], <i>T</i>] ifile1 ifile2 ofile
eca_cwfi	Cold-spell days index wrt 10th percentile of reference period
Syntax	eca_cwfi [<i>,nday</i>] 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 [<i>,nday</i>], <i>T</i>] ifile ofile
eca_hd	Heating degree days per time period
Syntax	eca_hd [<i>,T1</i>], <i>T2</i>] ifile ofile
eca_hwdi	Heat wave duration index wrt mean of reference period
Syntax	eca_hwdi [<i>,nday</i>], <i>T</i>] ifile1 ifile2 ofile
eca_hwfi	Warm spell days index wrt 90th percentile of reference period
Syntax	eca_hwfi [<i>,nday</i>] 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 <i>[,mode]</i> ifile ofile
eca_rx5day	Highest five-day precipitation amount per time period
Syntax	eca_rx5day <i>[,x]</i> 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 <i>[,T]</i> 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 <i>[,T]</i> 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