

CDO Reference Card

Climate Data Operators
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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 < <i>nbits</i> >	Set the number of bits for output precision (32/64 for nc,nc2,nc4,srv,ext,ieg; 1 - 32 for grb)
-f < <i>format</i> >	Output file format (grb,nc,nc2,nc4,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: echan4 echan5 mpiom1
-V	Print the version number
-v	Print extra details for some operators
-z <i>szip</i>	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	< <i>operator</i> > <i>ifiles</i>
sinfo	Short dataset information listed by code number
sinfov	Short dataset information listed by variable name
Syntax	< <i>operator</i> > <i>ifiles</i>
diff	Compare two datasets listed by code number
diffv	Compare two datasets listed by variable name
Syntax	< <i>operator</i> > <i>ifile1 ifile2</i>
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	< <i>operator</i> > <i>ifile</i>
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	< <i>operator</i> > <i>ifile</i>

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

File operations

copy	Copy datasets
cat	Concatenate datasets
Syntax	< <i>operator</i> > <i>ifiles ofile</i>
replace	Replace variables
Syntax	replace <i>ifile1 ifile2 ofile</i>
merge	Merge datasets with different fields
mergetime	Merge datasets sorted by date and time
Syntax	< <i>operator</i> > <i>ifiles ofile</i>
splitcode	Split code numbers
splitname	Split variable names
splitlevel	Split levels
splitgrid	Split grids
splitzaxis	Split z-axes
Syntax	< <i>operator</i> > <i>ifile oprefix</i>
splithour	Split hours
splitday	Split days
splitmon	Split months
splitseas	Split seasons
splityear	Split years
Syntax	< <i>operator</i> > <i>ifile oprefix</i>
splitset	Split time selection
Syntax	splitset , <i>nsets</i> [, <i>noffset</i> [, <i>nskip</i>]] <i>ifile oprefix</i>

Selection

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

selimestep	Select time steps
Syntax	selimestep , <i>timesteps ifile ofile</i>
seltime	Select times
Syntax	seltime , <i>times ifile ofile</i>
selhour	Select hours
Syntax	selhour , <i>hours ifile ofile</i>
selday	Select days
Syntax	selday , <i>days ifile ofile</i>
selmon	Select months
Syntax	selmon , <i>months ifile ofile</i>
selyear	Select years
Syntax	selyear , <i>years ifile ofile</i>
selseas	Select seasons
Syntax	selseas , <i>seasons ifile ofile</i>
seldate	Select dates
Syntax	seldate , <i>date1</i> [, <i>date2</i>] <i>ifile ofile</i>
selmon	Select single month
Syntax	selmon , <i>month</i> [, <i>nts1</i> [, <i>nts2</i>]] <i>ifile ofile</i>
sellonlatbox	Select a longitude/latitude box
Syntax	sellonlatbox , <i>lon1,lon2,lat1,lat2 ifile ofile</i>
selindexbox	Select an index box
Syntax	selindexbox , <i>idx1,idx2,idy1,idy2 ifile ofile</i>

Conditional selection

ifthen	If then
ifnotthen	If not then
Syntax	< <i>operator</i> > <i>ifile1 ifile2 ofile</i>
ifthenelse	If then else
Syntax	ifthenelse <i>ifile1 ifile2 ifile3 ofile</i>
ifthenc	If then constant
ifnotthenc	If not then constant
Syntax	< <i>operator</i> >, <i>c ifile ofile</i>

Comparison

eq	Equal
ne	Not equal
le	Less equal
lt	Less than
ge	Greater equal
gt	Greater than
Syntax	< <i>operator</i> > <i>ifile1 ifile2 ofile</i>
eqc	Equal constant
nec	Not equal constant
lec	Less equal constant
ltc	Less than constant
gec	Greater equal constant
gtc	Greater than constant
Syntax	< <i>operator</i> >, <i>c ifile ofile</i>

Modification

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

setdate	Set date
Syntax	setdate , <i>date ifile ofile</i>
settime	Set time of the day
Syntax	settime , <i>time ifile ofile</i>
setday	Set day
Syntax	setday , <i>day ifile ofile</i>
setmon	Set month
Syntax	setmon , <i>month ifile ofile</i>
setyear	Set year
Syntax	setyear , <i>year ifile ofile</i>
setunits	Set time units
Syntax	setunits , <i>units ifile ofile</i>
settaxis	Set time axis
Syntax	settaxis , <i>date,time</i> [, <i>inc</i>] <i>ifile ofile</i>
setreftime	Set reference time
Syntax	setreftime , <i>date,time ifile ofile</i>
setcalendar	Set calendar
Syntax	setcalendar , <i>calendar ifile ofile</i>
shifttime	Shift time steps
Syntax	shifttime , <i>sval ifile ofile</i>
chcode	Change code number
Syntax	chcode , <i>oldcode,newcode</i> [,...] <i>ifile ofile</i>
chname	Change variable name
Syntax	chname , <i>oldname,newname</i> ,... <i>ifile ofile</i>
chlevel	Change level
Syntax	chlevel , <i>oldlev,newlev</i> ,... <i>ifile ofile</i>
chlevelc	Change level of one code
Syntax	chlevelc , <i>code,oldlev,newlev ifile ofile</i>
chlevelv	Change level of one variable
Syntax	chlevelv , <i>name,oldlev,newlev ifile ofile</i>
setgrid	Set grid
Syntax	setgrid , <i>grid ifile ofile</i>
setgridtype	Set grid type
Syntax	setgridtype , <i>gridtype ifile ofile</i>
setzaxis	Set z-axis
Syntax	setzaxis , <i>zaxis ifile ofile</i>
setgatt	Set global attribute
Syntax	setgatt , <i>attname,attstring ifile ofile</i>
setgatts	Set global attributes
Syntax	setgatts , <i>attfile ifile ofile</i>
invertlat	Invert latitudes
Syntax	invertlat <i>ifile ofile</i>
invertlev	Invert levels
Syntax	invertlev <i>ifile ofile</i>
maskregion	Mask regions
Syntax	maskregion , <i>regions ifile ofile</i>
masklonlatbox	Mask a longitude/latitude box
Syntax	masklonlatbox , <i>lon1,lon2,lat1,lat2 ifile ofile</i>
maskindexbox	Mask an index box
Syntax	maskindexbox , <i>idx1,idx2,idy1,idy2 ifile ofile</i>
setclonlatbox	Set a longitude/latitude box to constant
Syntax	setclonlatbox , <i>c,lon1,lon2,lat1,lat2 ifile ofile</i>
setcindexbox	Set an index box to constant
Syntax	setcindexbox , <i>c,idx1,idx2,idy1,idy2 ifile ofile</i>
enlarge	Enlarge fields
Syntax	enlarge , <i>grid ifile ofile</i>
setmissval	Set a new missing value
Syntax	setmissval , <i>newmiss ifile ofile</i>
setctomiss	Set constant to missing value
setmisstoc	Set missing value to constant
Syntax	< <i>operator</i> >, <i>c ifile ofile</i>
setrtomiss	Set range to missing value
Syntax	setrtomiss , <i>rmin,rmax ifile ofile</i>

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
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> , <i>c</i> 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
timspctl	Time range percentiles
Syntax	timspctl , <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
remapcon	Conservative remapping
remapdis	Distance-weighted average remapping
Syntax	<operator> , <i>grid</i> ifile ofile
genbil	Generate bilinear interpolation weights
genbic	Generate bicubic interpolation weights
gencon	Generate conservative interpolation weights
gendis	Generate distance-weighted average 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
intgridbil	Bilinear grid interpolation
Syntax	<operator> , <i>grid</i> ifile ofile
remapeta	Remap vertical hybrid level
Syntax	remapeta , <i>vet</i> [, <i>oro</i>] ifile ofile
m12pl	Model to pressure level interpolation
Syntax	m12pl , <i>plevels</i> ifile ofile
m12hl	Model to height level interpolation
Syntax	m12hl , <i>hlevels</i> ifile ofile
intlevel	Linear level interpolation
Syntax	intlevel , <i>levels</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 ofile

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 , <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	ASCH input
Syntax	input , <i>grid</i> ofile
inputsvr	SERVICE input
inputext	EXTRA 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
outputsvr	SERVICE output
outputext	EXTRA 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
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 per
Syntax	eca_cwdi [, <i>nday</i> [, <i>T</i>]] ifile1 ifile2 ofile

eca_cwfi	Cold-spell days index wrt 10th percentile of reference period	eca_tx90p	Very warm days percent wrt 90th percentile of reference period
Syntax	eca_cwfi [,nday] ifile1 ifile2 ofile	Syntax	eca_tx90p 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[,fland]]] ifile1 ifile2 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_sdi	Simple daily intensity index per time period		
Syntax	eca_sdi 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		