CDO Reference Card

Climate Data Operators
Version 1.4.5
June 2010

Uwe Schulzweida
Max-Planck-Institute for Meteorology

http://www.mpimet.mpg.de/cdo

Syntax

cdo [**Options**] **Operator1** [–**Operator2** [–**OperatorN**]]

Options

-a	Generate an absolute time axis
-b <*nbits*>	Set the number of bits for the output precision (I8/I16/I32/F32/F64 for nc,nc2,nc4; F32/F64 for srv,ext,ieg; 1-32 for grb) Add L or B for Little or Big endian byteorder
-f <*format*>	Output file format (grb,nc,nc2,nc4,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	Indicate that the I/O streams have missing values
-m <*missval*>	Set the default missing value (default: `-9e+33`)
-R	Convert GRIB data from reduced to regular grid
-r	Generate a relative time axis
-s	Silent mode
-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
-z szip	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	<*operator*> `ifiles`

sinfo	Short dataset information listed by code number
sinfov	Short dataset information listed by variable name
Syntax	<*operator*> `ifiles`

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
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 code numbers
showname	Show variable names
showstdname	Show standard names
showlevel	Show levels
showltype	Show GRIB level types
showyear	Show years
showmon	Show months
showdate	Show date information
showtime	Show time information
showtimestamp	Show timestamp
Syntax	<*operator*> `ifile`

pardes	Parameter description
griddes	Grid description
zaxisdes	Z-axis 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 z-axes
splittabnum	Split parameter table numbers
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*>,*varnames* `ifile ofile`
selstdname	Select variables by standard name
Syntax	**selstdname**,*stdnames* `ifile ofile`
sellevel	Select levels
Syntax	**sellevel**,*levels* `ifile ofile`
sellevidx	Select levels by index
Syntax	**sellevidx**,*levidx* `ifile ofile`
selgrid	Select grids
Syntax	**selgrid**,*grids* `ifile ofile`
selzaxis	Select z-axes
Syntax	**selzaxis**,*zaxes* `ifile ofile`
selltype	Select GRIB level types
Syntax	**selltype**,*ltypes* `ifile ofile`
seltabnum	Select parameter table numbers
Syntax	**seltabnum**,*tabnums* `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 than constant
gec	Greater equal constant
gtc	Greater than 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 of the day
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[,units]* `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**,*oldname,newname,...* `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**,*name,oldlev,newlev* `ifile ofile`

setgrid	Set grid
Syntax	**setgrid**,*grid* `ifile ofile`
setgridtype	Set grid type
Syntax	**setgridtype**,*gridtype* `ifile ofile`

setzaxis	Set z-axis
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 latitudes
Syntax	**invertlat** `ifile ofile`

invertlev	Invert levels
Syntax	**invertlev** `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**,*newmiss* `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
setvrange	Set valid range
Syntax	<*operator*>,*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
pow	Power
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
reci	Reciprocal value
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`

monadd	Add monthly time series
monsub	Subtract monthly time series
monmul	Multiply monthly time series
mondiv	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
ymondiv	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**

consects	Consecutive Timesteps
Syntax	<*operator*> `ifile ofile`

ens<*STAT*>	Statistical values over an ensemble
Syntax	<*operator*> `ifiles ofile`
enspctl	Ensemble percentiles
Syntax	**enspctl**,*p* `ifiles ofile`

fld<*STAT*>	Statistical values over a field
Syntax	<*operator*> `ifile ofile`
fldpctl	Field percentiles
Syntax	**fldpctl**,*p* `ifile ofile`

zon<*STAT*>	Zonal statistical values
Syntax	<*operator*> `ifile ofile`
zonpctl	Zonal percentiles
Syntax	**zonpctl**,*p* `ifile ofile`

mer<*STAT*>	Meridional statistical values
Syntax	<*operator*> `ifile ofile`
merpctl	Meridional percentiles
Syntax	**merpctl**,*p* `ifile ofile`

gridbox<*STAT*>	Statistical values over grid boxes
Syntax	<*operator*>,*nx*,,*ny* `ifile ofile`

vert<*STAT*>	Vertical statistical values
Syntax	<*operator*> `ifile ofile`

timsel<*STAT*>	Time range statistical values
Syntax	<*operator*>,*nsets[,noffset[,nskip]]* `ifile ofile`

timselpctl	Time range percentiles
Syntax	**timselpctl**,*p*,*nsets[,noffset[,nskip]]* `ifile1 ifile2 i`

run<*STAT*>	Running statistical values
Syntax	<*operator*>,*nts* `ifile ofile`

runpctl	Running percentiles
Syntax	**runpctl**,*p*,*nts* `ifile1 ofile`

tim<*STAT*>	Statistical values over all time steps
Syntax	<*operator*> `ifile ofile`

timpctl	Time percentiles
Syntax	**timpctl**,*p* `ifile1 ifile2 ifile3 ofile`

hour<*STAT*>	Hourly statistical values
Syntax	<*operator*> `ifile ofile`

hourpctl	Hourly percentiles
Syntax	**hourpctl**,*p* `ifile1 ifile2 ifile3 ofile`

day<*STAT*>	Daily statistical values
Syntax	<*operator*> `ifile ofile`

daypctl	Daily percentiles
Syntax	**daypctl**,*p* `ifile1 ifile2 ifile3 ofile`

mon<*STAT*>	Monthly statistical values
Syntax	<*operator*> `ifile ofile`

monpctl	Monthly percentiles
Syntax	**monpctl**,*p* `ifile1 ifile2 ifile3 ofile`

year<*STAT*>	Yearly statistical values
Syntax	<*operator*> `ifile ofile`

yearpctl	Yearly percentiles
Syntax	**yearpctl**,*p* `ifile1 ifile2 ifile3 ofile`

seas<*STAT*>	Seasonal statistical values
Syntax	<*operator*> `ifile ofile`

seaspctl	Seasonal percentiles
Syntax	**seaspctl**,*p* `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**,*p* `ifile1 ifile2 ifile3 ofile`

ymon<*STAT*>	Multi-year monthly statistical values
Syntax	<*operator*> `ifile ofile`

ymonpctl	Multi-year monthly percentiles
Syntax	**ymonpctl**,*p* `ifile1 ifile2 ifile3 ofile`

yseas<*STAT*>	Multi-year seasonal statistical values
Syntax	<*operator*> `ifile ofile`

yseaspctl	Multi-year seasonal percentiles
Syntax	**yseaspctl**,*p* `ifile1 ifile2 ifile3 ofile`

ydrun<*STAT*>	Multi-year daily running statistical values
Syntax	<*operator*>,*nts* `ifile ofile`

ydrunpctl	Multi-year daily running percentiles
Syntax	**ydrunpctl**,*p*,*nts* `ifile1 ifile2 ifile3 ofile`

Correlation

fldcor	Correlation in grid space
Syntax	**fldcor** `ifile1 ifile2 ofile`

timcor	Correlation over time
Syntax	**timcor** `ifile1 ifile2 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`

EOFs

eof	Calculate EOFs in spatial or time space
eoftime	Calculate EOFs in time space
eofspatial	Calculate EOFs in spatial space
Syntax	<*operator*>,*neof* `ifile ofile1 ofile2`

eofcoeff	Calculate principal coefficients of EOFs
Syntax	**eofcoeff** `ifile1 ifile2 obase`

Interpolation

remapbil	Bilinear interpolation
remapbic	Bicubic interpolation
remapdis	Distance-weighted average remapping
remapnn	Nearest neighbor remapping
remapcon	First order conservative remapping
remapcon2	Second order conservative remapping
remaplaf	Largest area fraction remapping
Syntax	<*operator*>,*grid* `ifile ofile`

genbil	Generate bilinear interpolation weights
genbic	Generate bicubic interpolation weights
gendis	Generate distance-weighted average remap weights
gennn	Generate nearest neighbor remap weights
gencon	Generate 1st order conservative remap weights
gencon2	Generate 2nd order conservative remap weights
genlaf	Generate largest area fraction remap weights
Syntax	<*operator*>,*grid* `ifile ofile`

remap	SCRIP grid remapping
Syntax	**remap**,*grid*,*weights* `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`

intlevel	Linear level interpolation
Syntax	**intlevel**,*levels* `ifile ofile`

inttime	Interpolation between time steps
Syntax	**inttime**,*date*,*time[,inc]* `ifile ofile`
intntime	Interpolation between time steps
Syntax	**intntime**,*n* `ifile ofile`

intyear	Interpolation between two years
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`

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`

Import/Export

import_binary	Import binary data sets
Syntax	**import_binary** `ifile ofile`

import_cmsaf	Import CM-SAF HDF5 files
Syntax	**import_cmsaf** `ifile ofile`

import_amsr	Import AMSR binary files
Syntax	**import_amsr** `ifile ofile`

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

output	ASCII output
Syntax	**output** `ifiles`
outputf	Formatted output
Syntax	**outputf**,*format*,*nelem* `ifiles`
outputint	Integer output
outputsrv	SERVICE ASCII output
outputext	EXTRA ASCII 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`

setvals	Set list of old values to new values
Syntax	**setvals**,*oldval*,*newval[,...]* `ifile ofile`
setrtoc	Set range to constant
Syntax	**setrtoc**,*rmin*,*rmax*,*c* `ifile ofile`
setrtoc2	Set range to constant others to constant2
Syntax	**setrtoc2**,*rmin*,*rmax*,*c*,*c2* `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 numbers
Syntax	**random**,*grid[,seed]* `ofile`

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

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