

## CDO Utilities

The [CDO \(Climate Data Operators\)](#) package is a collection of command line operators to manipulate and analyze climate model data.

The Max Planck Institute for Meteorology has developed CDO, which supports GRIB, CF-compliant netCDF, and several other formats. There are more than 400 operators available. CDO supports rectangular, curvilinear and unstructured grid types.

CDO includes the ability to pipe an output stream of one operator into another, eliminating unnecessary I/O and temporary files, and allowing parallel processing.

Categories of CDO operators include:

<b>File information</b>	Print information about datasets
<b>File operations</b>	Copy, split and merge datasets
<b>Selection</b>	Select parts of a dataset
<b>Comparison</b>	Compare datasets
<b>Modification</b>	Modify datasets
<b>Arithmetic</b>	Arithmetically process datasets
<b>Statistical values</b>	Ensemble, field, vertical and time range statistic
<b>Regression</b>	Detrend of time series
<b>Interpolation</b>	Field, vertical and time interpolation
<b>Transformation</b>	Spectral transformation
<b>Formatted I/O</b>	ASCII input and output
<b>Climate indices</b>	ECA Indices of Daily Temperature and Precipitation Extremes

Some examples:

- To print information and simple statistics for each field of *ifile*:
  - `cdo info ifile`
- To print the max absolute and relative difference for each field of two datasets *ifile1* and *ifile2* use:
  - `cdo diff ifile1 ifile2`
- To change the format of a dataset *ifile* to the netCDF file *ofile* use:
  - `cdo -f nc copy ifile ofile.nc`
- To select the region with the longitudes from 120E to 90W and latitudes from 20N to 20S from all input fields in *ifile* and write the result to *ofile* use:

- `cdo sellonlatbox,120,-90,20,-20 ifile ofile`
- To compute the ensemble mean over 6 input files use and write in *ofile*:
- `cdo ensmean ifile1 ifile2 ifile3 ifile4 ifile5 ifile6 ofile`

**NetCDF-4 note:** CDO supports the netCDF-4 classic data model with compression.