

WorldClim - Global Climate Data

Free climate data for ecological modeling and GIS

[Home](#)

Data format

On this page there is information about WorldClim Version 1 [data format](#), [file names](#) and [file format](#).

Data Format

These layers (grid data) cover the global land areas except Antarctica. They are in the latitude / longitude coordinate reference system (not projected) and the datum is WGS84. There are four monthly variables: average minimum, mean, and maximum temperature and precipitations. There are also 18 [bioclimatic variables](#).

Please note that the temperature data are in °C * 10. This means that a value of 231 represents 23.1 °C. This does lead to some confusion, but it allows for much reduced file sizes which is important as for many downloading large files remains difficult. The unit used for the precipitation data is mm (millimeter).

The data are available at 4 different spatial resolutions; from 30 seconds ($0.93 \times 0.93 = 0.86 \text{ km}^2$ at the equator) to 2.5, 5 and 10 minutes ($18.6 \times 18.6 = 344 \text{ km}^2$ at the equator). The original data were at a 30 second resolution, the other data have been derived through aggregation, by calculating the mean of groups of cells. Cells with 'no data' were ignored. In other words, if some of the original cells were on land, and some cells were on sea, the aggregate cells have data. Only if all original cells have 'no data' then the aggregate cell has 'no data'. Aggregation was done for monthly precipitation, minimum, mean and maximum temperature. The Bioclimatic variables were calculated from these aggregated data.

File Names

The data are stored in ZIP (compressed) files. There is a ZIP file for each combination of resolution/format and climate element (mean, min, and max monthly average temperature and monthly total precipitation), the [bioclimatic variables](#), and altitude.

The ZIP files have names like X_R_F.ZIP, where X indicates the variable (TMEAN, TMIN, TMAX, PREC, BIO, or ALT); R indicates the resolution (10m, 5m, 2_5m, 30s); F indicates to format: 'BIL' for generic grids, and 'ESRI' for ESRI grids. For example, the file TMIN_5m_BIL.ZIP has the minimum temperature data, at 5 minute resolution, in generic grid format.

The ZIP files with climate element data contain 12 data layers (one for each month); the bioclimatic ZIP file contains 19 data layers; and the altitude ZIP file contains one layer. There are small differences between filenames based on their resolution/format, but basically they are like specified below:

tmean<m>_<r>.ext

tmin<m>_<r>.ext

tmax<m>_<r>.ext

prec<m>_<r>.ext

bio<x>_<r>.ext

alt_<r>.ext

tmean = average monthly mean temperature (°C * 10)

tmin = average monthly minimum temperature (°C * 10)

tmax = average monthly maximum temperature (°C * 10)

prec = average monthly precipitation (mm)

bio = [bioclimatic variables](#) derived from the tmean, tmin, tmax and prec

alt = altitude (elevation above sea level) (m) (from [SRTM](#))

m = month of the year, from 1 (January) to 12 (December)

x = code for the [bioclimatic variable](#)

ext = filename extension (for the Generic grids only), either **BIL** (with the binary data), or **HDR** (text files that describe the data, for import to GIS applications). In case of ESRI grids, these filenames are in fact folder names, and also include one "info" folder.

tilled data

The tiled data comes in 30 x 30 degree tiles, each consisting of 3600 rows and 3600 columns.

Tiled data (only available for 30 second resolution, and in generic grid format) has a slightly different syntax:

```
tmean<m>_<z>.ext
tmin<m>_<z>.ext
tmax<m>_<z>.ext
prec<m>_<z>.ext
bio<x>_<z>.ext
alt_<z>.ext
```

In which **z** = zone, from 00 to 411, see map on [download page](#) (only for 30-seconds resolution)

File Format

1) ESRI grid (raster) format.

For use with ESRI products (ArcSomething). The ZIP files should be uncompressed into a new folder. Each grid is stored in a subfolder. There is also an INFO folder that should remain with these grids (for more information see your ESRI manuals).

2) GeoTIFF format.

The 30 second [tiles](#) are also available in GeoTIFF format.

3) Generic grid (raster) format.

Each layer consists of two files. One file with the actual data (.BIL); and one accompanying text (header) file (.HDR). Sometimes there are two more header files (.GRD and .RDC) for use in DIVA-GIS or IDRISI (see below). The data files (.BIL) are sequential binary files in which values are stored line by line from the upper-left to the lower-right corner. Each cell (pixel) is a signed 2 byte integer value. If you find that your application reports very large numbers, and no negative numbers, the files were probably interpreted as unsigned integers

Importing the generic grid data into your GIS application

The WorldClim data can be easily imported into most GIS applications. Here is some help:

R:

```
library(rgdal)
library(raster)
r = raster("tmin01")
```

Or download directly from within R. For example:

```
library(raster)
w = getData('worldclim', var='tmin', res=0.5, lon=5, lat=45)
```

See the raster package [vignette](#) for more info.

Idrisi:

Download the generic files, unzip and

import the data using the *.bil and *.hdr files.

Some of the .ZIP files also contain .RDC files. If you rename the .BIL files to .RST, they can be opened in IDRISI without the import procedure. Renaming is easy in command line (DOS) window. E.g., "D:\worldclim\ren *.bil *.rdc"

DIVA-GIS

Unzip the files. Use: Data\Import to gridfile\Multiple Files (BIL/BIP/BSQ).

Some of the .ZIP files also contain .GRD files. In that case, if you rename the .BIL files to .GRI they can be opened in DIVA-GIS without the import procedure. Renaming is easy in command line (DOS) window. E.g.,

```
"D:/worldclim/ren%20*.bil%20*.rdc">D:\worldclim\ren *.bil *.rdc"
```

Manifold GIS

Import the generic grid files with Import\Surface...\BIL Files (*.bil;*.hdr).

Set the Current Projection by right clicking the surface in the Project Panel\Projection\Current Projection\Latitude/Longitude.

