**Data Files for Occupancy Modelling**

**DEM**

<https://www.sciencebase.gov/catalog/item/4fb5495ee4b04cb937751d6d>

North America Elevation 1-Kilometer Resolution GRID

The North America elevation data were derived from the GTOPO30 elevation dataset (<http://eros.usgs.gov/products/elevation/gtopo30.html>) produced by the U.S.Geological Survey and from the Canada3D elevation dataset produced by the Centr for Topographic Information (Sherbrooke), Natural Resources Canada.GTOPO30 is a global digital elevation model (DEM) with a horizontal grid spacing of 30 arc seconds (approximately 1 kilometer).  GTOPO30 was derived from several raster and vector sources of topographic information.  It was developed between 1993 and 1996 through a collaborative effort led by staff at the U.S. Geological Survey's Earth Resources Observation and Science Center (EROS).  In the United States, GTOPO30 data were derived from the National Elevation Dataset (NED).  In Mexico, GTOPO30 data were derived from 3-arc-second elevation data from INEGI. These data were prepared by the U.S. Defense Mapping Agency (now National Geospatial-Intelligence Agency, NGA) using contour lines from the INEGI topographic national map series at 1:250,000 scale.  Elsewhere, GTOPO30 data were derived from several sources.Canada3D was developed by Natural Resources Canada as a national-level elevation dataset at 30-arc-second resolution. Details on the derivation of Canada3D data are available at the Web link referenced below.  In contrast to GTOPO30 data in Canada,Canada3D elevation data displayed relatively few artifacts and were of higher quality than GTOPO30, and were accordingly used for all land masses in Canada.

**Rainfall**

<https://www.esrl.noaa.gov/psd/data/gridded/data.UDel_AirT_Precip.html#detail>

University of Delaware Air Temperature & Precipitation

Monthly global gridded high resolution station (land) data for air temperature and precipitation from 1900-2014

Cort Willmott & Kenji Matsuura of the University of Delaware have put data together from a large number of stations, both from the GHCN2 (Global Historical Climate Network) and, more extensively, from the archive of Legates & Willmott. More details can be found [here for temperature](http://climate.geog.udel.edu/~climate/html_pages/Global2011/README.GlobalTsT2011.html) and [here for precipitation](http://climate.geog.udel.edu/~climate/html_pages/Global2011/README.GlobalTsP2011.html). The result is a monthly climatology of precipitation and air temperature, both at the surface, and a time series, spanning 1900 to 2010, of monthly mean surface air temperatures, and monthly total precipitation. It is land-only in coverage, and complements the [ICOADS](http://icoads.noaa.gov/) (International Comprehensive Ocean-Atmosphere Data Set) data set well. For a complete description of the data as given by the providers, related datasets and references to relevant papers please see their web pages at the [University of Delaware](http://climate.geog.udel.edu/~climate/).

0.5 degree latitude x 0.5 degree longitude global grid (720x360).

89.75N - 89.75S, 0.25E - 359.75E.

**Land Cover 1km Res**

<https://nationalmap.gov/small_scale/mld/landcvi.html>

North American Land Cover Characteristics – 1 Kilometer Resolution

What this map layer shows:

Twenty-five broad classes of land cover, such as urban areas, forests, and croplands, at a resolution of one kilometer.

Land cover characteristics data describe the nature of the land surface at a particular location. The staff at the U.S. Geological Survey (USGS), National Center for Earth Resources Observation and Science (EROS), in cooperation with the University of Nebraska-Lincoln, and the European Commission's Joint Research Centre compile land cover data as part of the Global Land Cover Characterization Program (GLCC). This effort is part of the National Aeronautics and Space Administration Earth System Science Pathfinder Program. The land cover information is drawn from Advanced Very High Resolution Radiometer (AVHRR) data and results in a 1-km resolution global land cover characteristics database that is used for a wide range of environmental research and modeling applications, including watershed management, environmental inventories, and land management.

The North American Land Cover Characteristics – 1 Kilometer Resolution map layer is an image showing the types of land cover found in North America, excluding Hawaii, the eastern part of Greenland, southern Mexico, and Central America. There are 25 classes of land cover, including urban and built-up land, cropland and pasture, shrubland, grassland, deciduous and evergreen forest, water, wetlands, and tundra. This map layer was compiled by EROS.

The National Map Small-Scale Collection also includes a 200 meter resolution image showing more detailed Conterminous United States Land Cover, with classification based on a modified Anderson classification scheme.

**0.5 km MODIS-based Global Land Cover Climatology**

<https://archive.usgs.gov/archive/sites/landcover.usgs.gov/global_climatology.html>

Description: These data describe land cover type, and are based on 10 years (2001-2010) of Collection 5.1 MCD12Q1 land cover type data. The map is generated by choosing, for each pixel, the land cover classification with the highest overall confidence from 2001-2010, as described in Broxton et al., 2014. As such, they are reflective of the training data for the MDC12Q1 data. Near the edges of the map (generally within 0.05 degrees of 180 degrees longitude, and over parts of Antarctica-mostly south of -85 degrees latitude), we have also manually filled obvious spurious edge effects with nearby land cover types. The data has been re-gridded from the MODIS sinusoidal grid to a regular latitude-longitude grid, and the map has 43200x86400 pixels (corresponding to a resolution of 15 arc seconds).

Format: The data are provided in GeoTIFF format (as 8-bit unsigned integers), and compressed (which reduces the file size from 3.5 gb to 86 mb).

Preferred Citation: Broxton, P.D., Zeng, X., Sulla-Menashe, D., Troch, P.A., 2014a: A Global Land Cover Climatology Using MODIS Data. J. Appl. Meteor. Climatol., 53, 1593–1605. doi: <http://dx.doi.org/10.1175/JAMC-D-13-0270.1>

0 Water

1 Evergreen Needle leaf Forest

2 Evergreen Broadleaf Forest

3 Deciduous Needle leaf Forest

4 Deciduous Broadleaf Forest

5 Mixed Forests

6 Closed Shrublands

7 Open Shrublands

8 Woody Savannas

9 Savannas

10 Grasslands

11 Permanent Wetland

12 Croplands

13 Urban and Built-Up

14 Cropland/Natural Vegetation Mosaic

15 Snow and Ice

16 Barren or Sparsely Vegetated

**Maximum Green Vegetation Fraction**

<https://archive.usgs.gov/archive/sites/landcover.usgs.gov/green_veg.html>

1 km MODIS-based Maximum Green Vegetation Fraction

Description: These data describe annual maximum green vegetation fraction (MGVF), and are based on 12 years (2001-2012) of Collection 5 MOD13A2 normalized difference vegetation index (NDVI) data. Each map shows MGVF for one year (as well as the average, for all years from 2001-2012), based on the annual maximum NDVI and linear mixing models that describe green vegetation fraction (vs. non vegetated area) for each land cover class for each year. Generation of these data is described in Broxton et al., 2014b. The data has been re-gridded from the MODIS sinusoidal grid to a regular latitude-longitude grid, and the map has 21600x43200 pixels (corresponding to a resolution of 30 arc seconds).

Values range from 0 (corresponding to 0% vegetation cover) to 100 (corresponding to 100% vegetation cover).

Format: The data are provided in GeoTIFF format (as 8-bit unsigned integers), and compressed (which reduces the file size from 890 mb to about 100 mb per map).

Preferred Citation: Broxton P.D., Zeng, X., Scheftic, W., Troch, P.A., 2014b, A MODIS-Based 1 km Maximum Green Vegetation Fraction Dataset, J. Appl. Meteorol. Clim., DOI: http://dx.doi.org/10.1175/JAMC-D-13-0356.1.

**Information from Jimenez-Franco et al. (2019) - WORLDCLIM**

<http://worldclim.org/version1>

WorldClim version 1 has average monthly climate data for minimum, mean, and maximum temperature and for precipitation for 1960-1990. You can also download derived bioclimatic variables.

**Preferred citation:** Hijmans, R.J., S.E. Cameron, J.L. Parra, P.G. Jones and A. Jarvis, 2005. Very high resolution interpolated climate surfaces for global land areas. International Journal of Climatology 25: 1965-1978

**Get directly from R:**

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