FREE eBook

# LEARNING gdal

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#gdal

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# About

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# Chapter 1: Getting started with gdal

## Remarks

GDAL (Geospatial Data Abstraction Library) is a computer software library that provides tools for manipulating raster and vector geospatial data.

## Examples

### Installation on Linux

GDAL is available in the default repositories of most popular Linux distributions and can be installed in the same way that packages in a Linux distribution are usually installed.

```
apt-get install libgdal-dev
```

`CPLUS_INCLUDE_PATH` and `C_INCLUDE_PATH` are necessary in order to include these corresponding libraries.

```
export CPLUS_INCLUDE_PATH=/usr/include/gdal
```

```
export C_INCLUDE_PATH=/usr/include/gdal
```

GDAL can also be installed with Python's package manager `pip`.

```
xe pip install gdal
```

Read Getting started with gdal online: https://riptutorial.com/gdal/topic/7667/getting-started-with-gdal

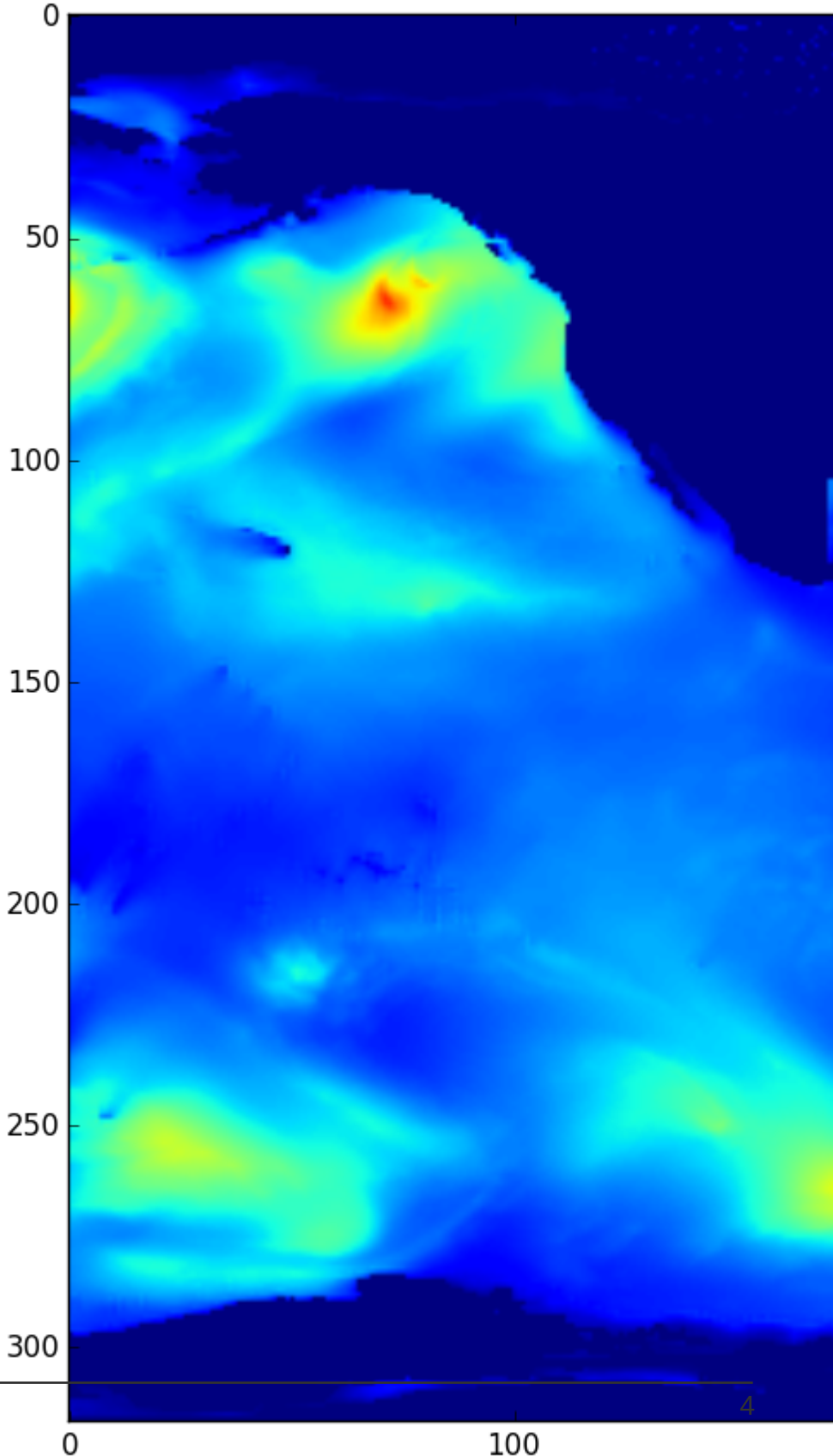
# Chapter 2: Read a netCDF file with gdal

## Examples

### Read a netCDF file (.nc) with python gdal

How to read a netCDF file (.nc) with python gdal ?

```
import gdal

# Path of netCDF file
netcdf_fname = "/filepath/PREVIMER_WW3-GLOBAL-30MIN.nc"

# Specify the layer name to read
layer_name = "hs"

# Open netcdf file.nc with gdal
ds = gdal.Open("NETCDF:{0}:{1}".format(netcdf_name, layer_name))

# Read full data from netcdf
data = ds.ReadAsArray(0, 0, ds.RasterXSize, ds.RasterYSize)
data[data < 0] = 0
```


0
50
100
150
200
250
300
0
100

https://riptutorial.com/gdal/topic/8003/read-a-netcdf-file-with-gdal

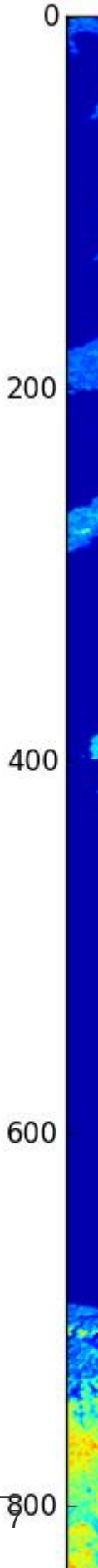
# Chapter 3: Reading rasters with gdal

## Examples

### Read subset of a global raster defined by a bounding box

Open a raster that covers the globe and extract a subset of the raster.

```
import gdal

# Path to a tiff file covering the globe
# http://visibleearth.nasa.gov/view.php?id=57752
tif_name = "/path_name/land_shallow_topo_21600.tif"

# Open raster in read only mode
ds = gdal.Open(tif_name, gdal.GA_ReadOnly)

# Get the first raster band
band = ds.GetRasterBand(1)

# Compute x/y resolution in degrees
resx = 360. / band.XSize
resy = 180. / band.YSize

# Define the geotransform used to convert x/y pixel to lon/lat degree
# [lon_topleft, lon_resolution, lat_skew, lat_topleft, lon_skew, lat_resolution]
geotransform = [-180, resx, 0.0,  90, 0.0, -1*resy]

# The inverse geotransform is used to convert lon/lat degrees to x/y pixel index
inv_geotransform = gdal.InvGeoTransform(geotransform)

# Define a longitude/latitude bounding box in degrees
# [lonmin, latmin, lonmax, latmax]
bbox = [-5, 40, 10, 55]

# Convert lon/lat degrees to x/y pixel for the dataset
_x0, _y0 = gdal.ApplyGeoTransform(inv_geotransform, bbox[0], bbox[1])
_x1, _y1 = gdal.ApplyGeoTransform(inv_geotransform, bbox[2], bbox[3])
x0, y0 = min(_x0, _x1), min(_y0, _y1)
x1, y1 = max(_x0, _x1), max(_y0, _y1)

# Get subset of the raster as a numpy array
data = band.ReadAsArray(int(x0), int(y0), int(x1-x0), int(y1-y0))
```


0
200
400
600
800

https://riptutorial.com/gdal/topic/7995/reading-rasters-with-gdal

# Credits

| S. No | Chapters | Contributors |
|---|---|---|
| 1 | Getting started with gdal | Chr, Community |
| 2 | Read a netCDF file with gdal | Chr |
| 3 | Reading rasters with gdal | Chr, Logan Byers |