Computing with Cloud-Optimized GeoTIFFs

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Outline

- What is a “Cloud-Optimized GeoTIFF” (COG)?
- How to use COG’s?
  - QGIS,
  - R: rgdal, terra package,
- Spatial overlay (in parallel);
- Modeling cropland distribution as a function of climate, terrain and soils;

COG explained

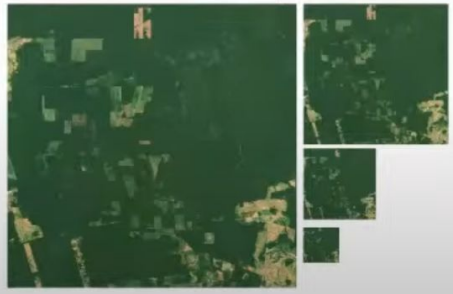
OpenGeoHub Summer School 2021 Day 1 - September 1 - block 1

Marius Appel

Cloud-optimized GeoTIFF (COG)

Image file formats must be cloud-friendly to reduce transfer times and costs associated with transfer and requests

- COG = Normal tiled GeoTIFF files whose content follows a **specific order of data and metadata** (see full spec here)
- support compression
- support efficient **HTTP range requests**, i.e. partial reading of images (blocks, and overviews) over cloud storage
- may contain overview images (image pyramids)



- GDAL can efficiently read and write COGs, and access object storage in the cloud with *virtual file systems*

1:18:19 / 2:01:35

18 / 28

Science

https://opendatascience.eu/geo-harmonizer/geospatial-data-tutorial/

This tutorial explains (a) how to access Geo-harmonizer geospatial layers, (b) how to use them as a database i.e. to query, subset, and download, (c) how to visualize data in QGIS or similar, and (d) how to add and register new layers. Minimum software requirements to follow this tutorial:

- QGIS,
- GDAL,
- R and/or Python,

Connected repository: https://gitlab.com/Geo-harmonizer_inea/spatial-layers

Accessing and viewing data

Raster or gridded data

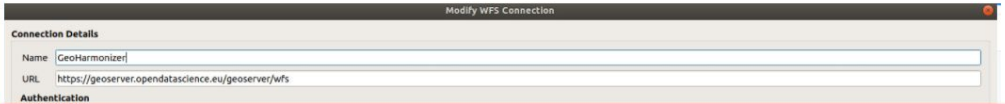
Geo-harmonizer serves a number of raster or gridded layers, usually prepared as Cloud-Optimized GeoTIFFs at 30-m or coarser resolution.

Vector data

Data can be imported into QGIS in a standard way through WFS service using URL:

https://geoserver.opendatascience.eu/geoserver/wfs

The loading might take some time because the dataset is large, therefore it's best to first zoom to area or feature of interest (for example Switzerland in the image below).



Soil and Agronomy Data Cube for Africa at 30-m spatial resolution

OpenGeoHub Follow
Apr 13 · 9 min read

Prepared by: Tom Hengl (OpenGeoHub) and Leandro Parente (OpenGeoHub)

> Earth Observation, soil, terrain, land cover and land use, climate data are increasingly available for Africa for research and businesses. This tutorial explains: how to access the iSDAsoil property and nutrient maps for Africa and number of Sentinel-2 cloud-free bands and terrain variables, how to compute with it without a need to download terrabytes of data. A complete tutorial written using Rmarkdown is available **here**. To learn more about Cloud-Optimized GeoTIFFs and geocomputing in Python please visit also **this tutorial**.

Africa Soil and Agrono...
Project information
Repository
Issues 3
Merge requests 0
Requirements
CI/CD
Deployments
Monitor
Packages & Registries
Analytics
Wiki
Snippets
Collapse sidebar

Africa Soil and Agronomy Data Cube

Project ID: 25216044

Star 2

10 Commits **1** Branch **0** Tags **16.8 MB** Files **16.8 MB** Storage

Accessing and using soil and agronomy data for Africa. See also: https://isda-africa.com/isdasoil

master africa-soil-and-agronomy-data-cube History Find file Clone

added histograms for samples
Tomislav Hengl (OpenGeoHub Foundation) authored 1 month ago

171439eb

README Other

Name	Last commit	Last update
README_files/figure-gfm	plotKML functionality	4 months ago
csv	added back-transformation functions	3 months ago
data	plotKML functionality	4 months ago
img	added predictions cropland	4 months ago
samples	added histograms for samples	1 month ago

OpenLandMap data cube: accessing, understanding and using COG's

Tomislav Hengl (tom.hengl@opengeohub.org) and Leandro Parente (leandro.parente@opengeohub.org) 03 February, 2021

OpenLandMap on Wasabi / Cloud-Optimized GeoTIFF

Part of: OpenLandMap global layers
Last update: 2021-02-03

Cloud-Optimized GeoTIFFs are post-processed images that are optimized for file sharing and can be considered to be equivalent to Geospatial databases as they can serve spatial queries (Kulkarni, Stano, Conover, Graves, & Maskey, 2019). All OpenLandMap layers available via the data portal are, in principle, immediately made available via our file service, hosted on Wasabi.com.

In this tutorial we explain how to access Cloud Optimized GeoTiffs-COG files, query values for COG's at point locations, retrieve the raster data only for a

What is STAC?

The SpatioTemporal Asset Catalog (STAC) specification provides a common language to describe a range of geospatial information, so it can more easily be indexed and discovered. A 'spatiotemporal asset' is any file that represents information about the earth captured in a certain space and time.

The goal is for all providers of spatiotemporal assets (Imagery, SAR, Point Clouds, Data Cubes, Full Motion Video, etc) to expose their data as SpatioTemporal Asset Catalogs (**STAC**), so that new code doesn't need to be written whenever a new data set or API is released.

Learn More

Catalogs

A list of STAC APIs and Static Catalogs.

Filter by Type

All APIs Static Catalogs

Filter by Access Level

All Public only Public & Protected only

Astraea Earth OnDemand

API Public

Astraea Earth OnDemand geospatial imagery query and analysis tool

https://eod-catalog-svc-prod.astraea.earth/

California Forest Observatory

Catalog Public

The Forest Observatory is a data-driven forest monitoring system that maps the drivers of wildfire behavior across the state with a focus on vegetation fuels. Data are available for non-commercial use under the Forest Observatory terms of use.

https://storage.googleapis.com/cfo-public/catalog.json

CBERS

Catalog Public

Imagery acquired by the China-Brazil Earth Resources Satellite (CBERS). The image files are recorded and processed by INPE and are converted to Cloud Optimized Geotiff format in order to optimize its use for cloud based applications. The repository contains all CBERS-4 MUX, AWFI, PAN5M and PAN10M scenes acquired since the start of the satellite mission and is daily updated with new scenes.

Conclusions

- “Cloud-Optimized GeoTIFF” (COG) is state-of-the-art standard to distribute data
- If you know how to use it, it functions as a geospatial database = you enable users to program spatial data analysis on top of your data;
- To further enhance use of your data, consider also adding all metadata into STAC;