Data description for - The geography factor: How environmental conditions shape methane monitoring from space

Global gridded data is provided in netCDF format. Data at the locations of GEM coal, oil and gas extraction sites and country production data are provided as CSV files. The global files are provided to enable data extraction for any location, not only the fossil fuel sites featured in the study, but also other sources such as landfill sites, and to support the creation of maps for sub-regions, countries, or other areas of interest.

The netCDF files can be viewed in QGIS (see description below for help), ArcGIS or using a netCDF viewer (like Panoply).

The 3 categories for methane detection by satellite are defined as difficult = 0, moderate = 1, favourable = 2

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Detection categories are difficult = 0, moderate = 1, favourable = 2

File name	Dimensions	Description
Global gridded data 0.1 x 0.1 degree resolution		
monthly_combined_category.nc	time=12, lat=1801, lon=3600	Detection category for each month
number_favourable_months.nc	lat=1801, lon=3600	Number of months with favourable category (category = 2)
albedo_swir.nc	time=12, lat=1801, lon=3600	Monthly albedo derived from Sentinel-2 (2020-2023)
wind.nc	time=12, lat=1801, lon=3600	Monthly mean ERA5 10m wind speed in m/s (2020-2023)
cs.nc	time=12, lat=1801, lon=3600	Monthly Cloud Score + derived from Sentinel-2 (2020-2023) cloudy=0 to clear=1
sza.nc	time=12, lat=1801, lon=3600	Monthly solar zenith angle in degrees
elev_std.nc	lat=1801, lon=3600	Standard deviation of elevation in meters from GMTED2010
Data at location of assets (last 12 columns of each file contains the albedo, wind speed etc ...)		

combined_class.csv	nrows=13560, ncols=30	Monthly categories at asset locations
albedo_swir.csv	nrows=13560, ncols=30	Monthly shortwave albedo derived from Sentinel-2 (2020-2023)
albedo_swir_class.csv	nrows=13560, ncols=30	Monthly categories after albedo threshold is applied
wind.csv	nrows=13560, ncols=30	Monthly ERA5 10m wind speed in m/s (2020-2023)
wind_class.csv	nrows=13560, ncols=30	Monthly category after wind speed threshold is applied
cs.csv	nrows=13560, ncols=30	Monthly cloud score+ (2020-2023)
cs_class.csv	nrows=13560, ncols=30	Monthly category after cloud score threshold is applied
sza.csv	nrows=13560, ncols=30	Monthly solar zenith angle in degrees
sza_class.csv	nrows=13560, ncols=30	Monthly category after solar zenith angle threshold is applied
elev_std.csv	nrows=13560, ncols=30	Monthly standard deviation of elevation in meters from GMTED2010.
elev_std_class.csv	nrows=13560, ncols=30	Monthly category after elevation threshold is applied
Country production data		
gem_coal_production_per_country.csv	nrows=39, ncols=9	Coal production and its percentage of the country's total coal output by category
gem_oil_gas_production_per_country.csv	nrows=58, ncols=9	Oil and gas production and its percentage of the country's total production by category.

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How to view netCDF data in QGIS

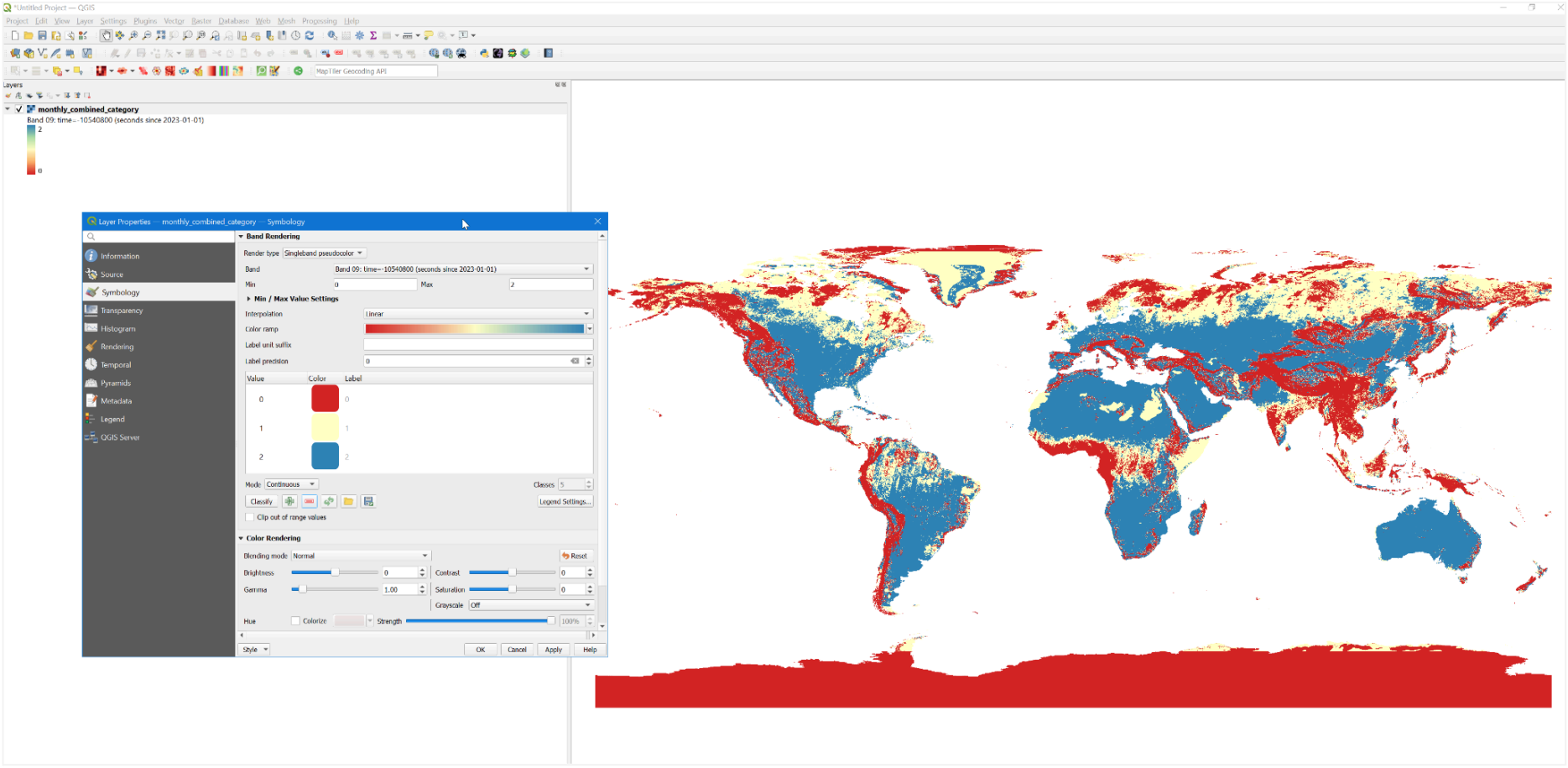
QGIS is an open source tool for working with geospatial data. To view the netCDF go to

Layer -> Add layer → Add raster layer→select the file monthly_combined_category.nc

Right click on the layer shown in bold font on the left hand side panel called monthly_combined_category

Symbology → Render type → Singleband pseudocolor.

Select the band (i.e. the month to view). The example below shows Band 09 which corresponds to September.


*Untitled Project — QGIS
Project Edit View Layer Settings Plugins Vector Raster Database Web Mesh Processing Help
MapTiler Geocoding API
Layers
monthly_combined_category
Band 09: time=-10540800 (seconds since 2023-01-01)
2
0
Layer Properties — monthly_combined_category — Symbology
Information
Source
Symbology
Transparency
Histogram
Rendering
Temporal
Pyramids
Metadata
Legend
QGIS Server
Band Rendering
Render type Singleband pseudocolor
Band Band 09: time=-10540800 (seconds since 2023-01-01)
Min 0 Max 2
Min / Max Value Settings
Interpolation Linear
Color ramp
Label unit suffix
Label precision 0
Value Color Label
0 0
1 1
2 2
Mode Continuous Classes 5
Classify Legend Settings...
Clip out of range values
Color Rendering
Blending mode Normal Reset
Brightness 0 Contrast 0
Gamma 1.00 Saturation 0
Grayscale Off
Hue Colorize Strength 100%
Style OK Cancel Apply Help