

GEOCUBES

Lassi Lehto
Finnish Geospatial Research Institute
Geoinformatics and Cartography

CSC and GeoPortti Services for Research
Dec 14, 2022

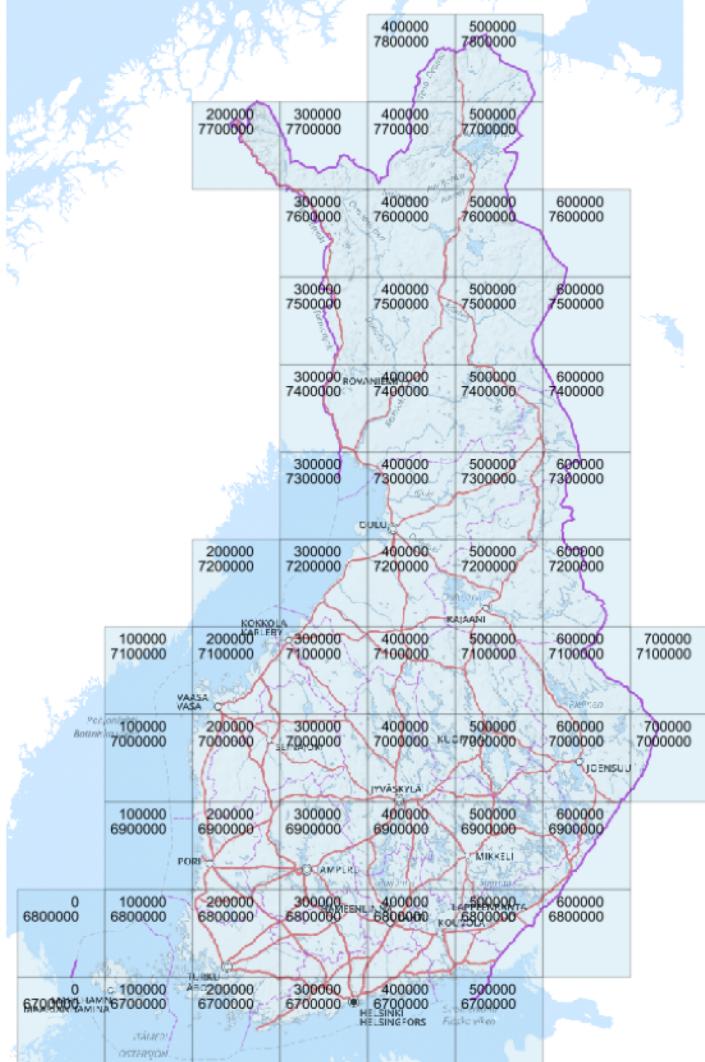


GEOCUBES

- An integrated and harmonized set of geospatial raster datasets made available on a cloud computing platform (CSC cPouta)
- Harmonized on
 - Georeferencing
 - Resolution in multiple levels
 - Spatial subdivision
 - Access mechanisms
 - Format
- Part of the GeoPortti research infrastructure

GEOCUBES

- Fixed grid, based on ETRS-TM35FIN
- Resolutions: 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000 m
- Divided in 60 blocks of 100 km * 100 km
- Implemented as Cloud-Optimized GeoTIFF (COG) files
- Available through
 - WCS, WMS/WMTS, http GET Range, virtual file (VRT), Custom API
 - OGC API Coverages
- Web Client, QGIS Plugin



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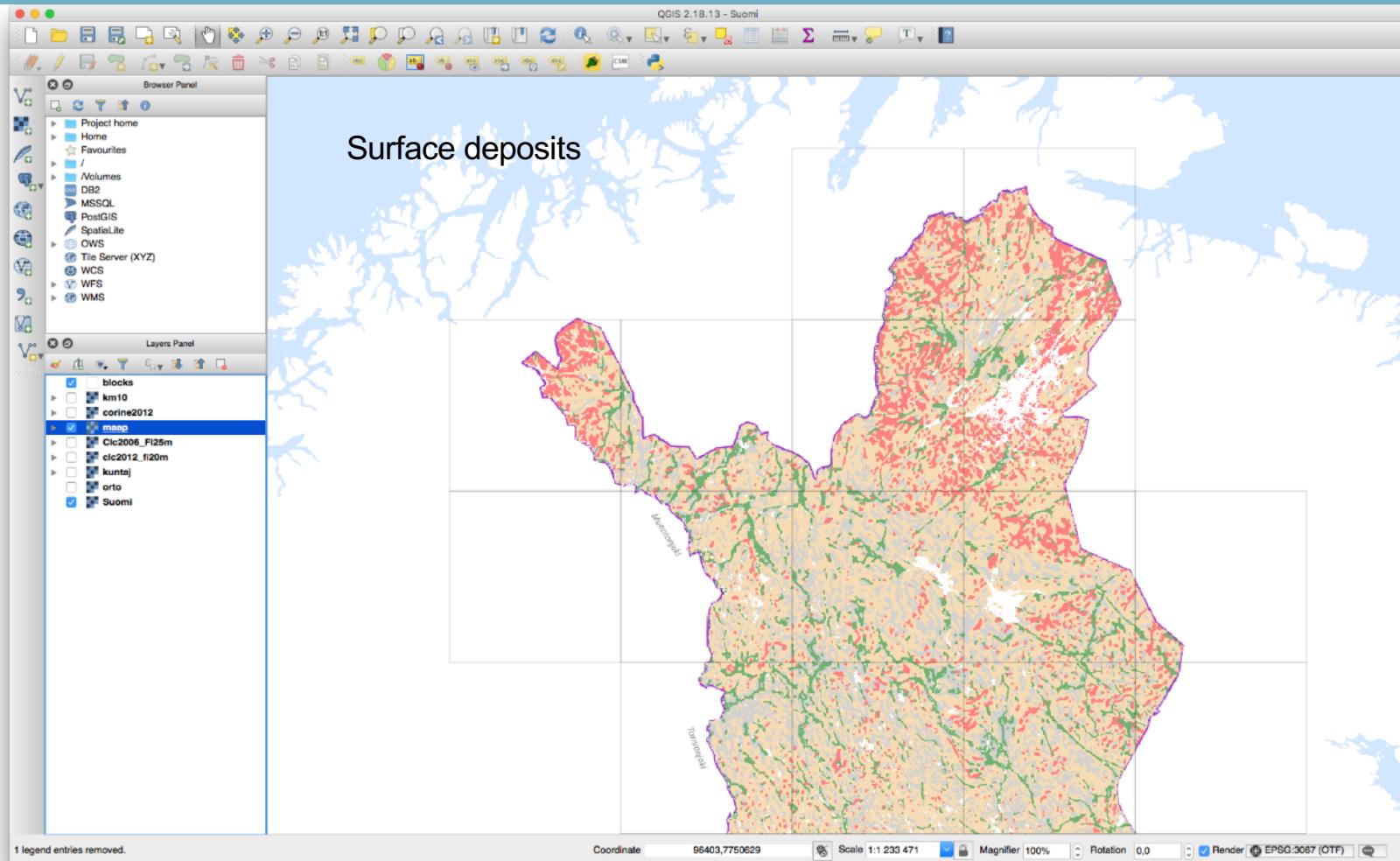
GEOCUBES CONTENT

- Surface deposits
 - Sources 1:20000, 1:200000 and 1:1M data sets
- CORINE Land Cover
 - 2000, 2006, 2012, 2018
- Forest inventory
 - Nine attributes; 2009, 2015
- DEM
 - 2 and 10 m source resolution
 - Slope, Aspect
- DSM
- Sea, Field parcels, Peatland, Buildings, Orthophoto
- Administrative units
 - Municipalities, counties, regions, country

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Updated to 2022



Browser Panel

- Project home
- Home
- Favourites
- /
- Volumes
- DB2
- MSSQL
- PostGIS
- Spatialite

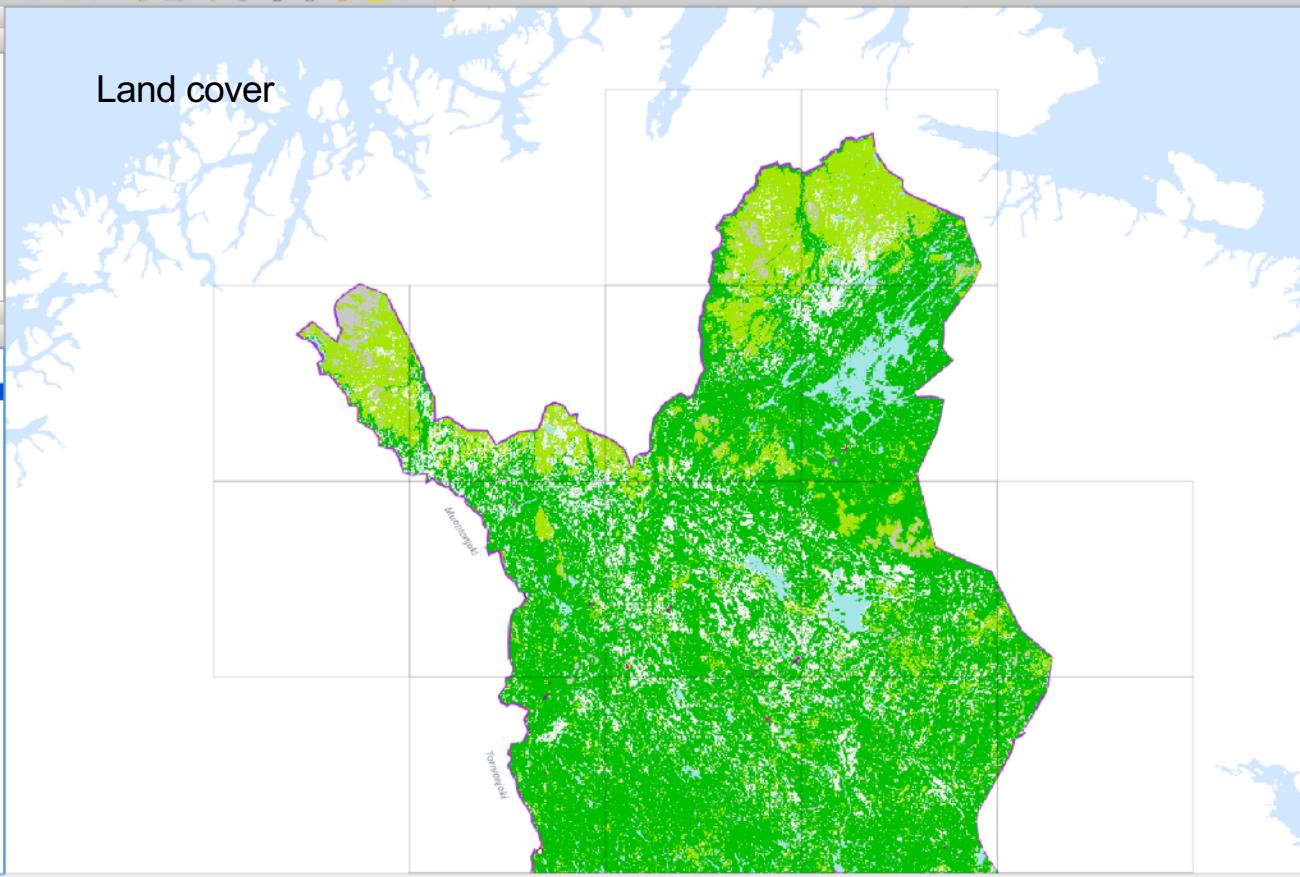
OWS

- Tile Server (XYZ)
- WCS
- WFS
- WMS

Layers Panel

- blocks
- km10
- corine2012
- mags
- Clic2006_Fl25m
- clic2012_fl20m
- kuntaej
- ortho
- Suomi

Land cover



1 legend entries removed.

Coordinate

103801.7753240



Scale 1:1 233 471



Magnifier 100%

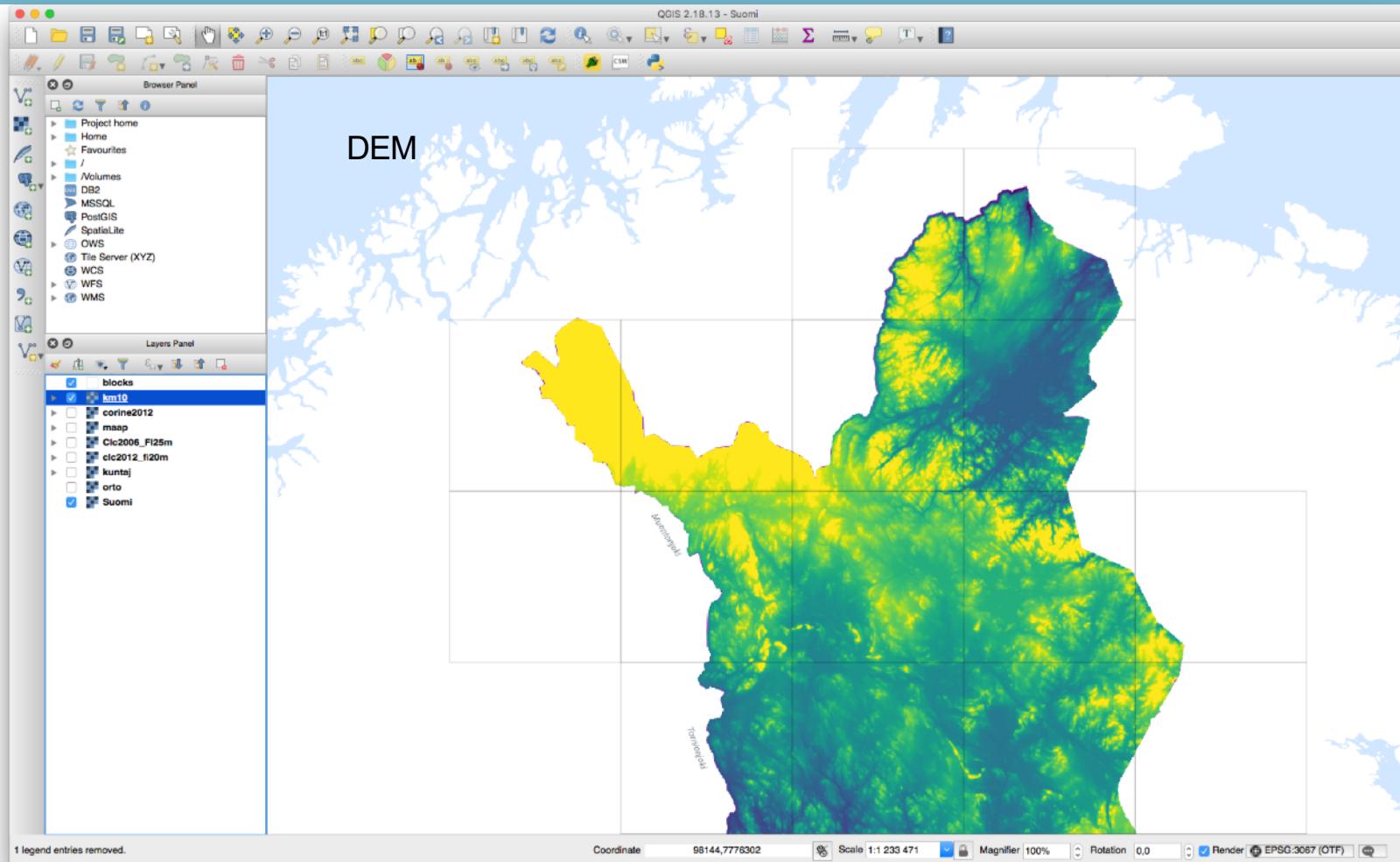


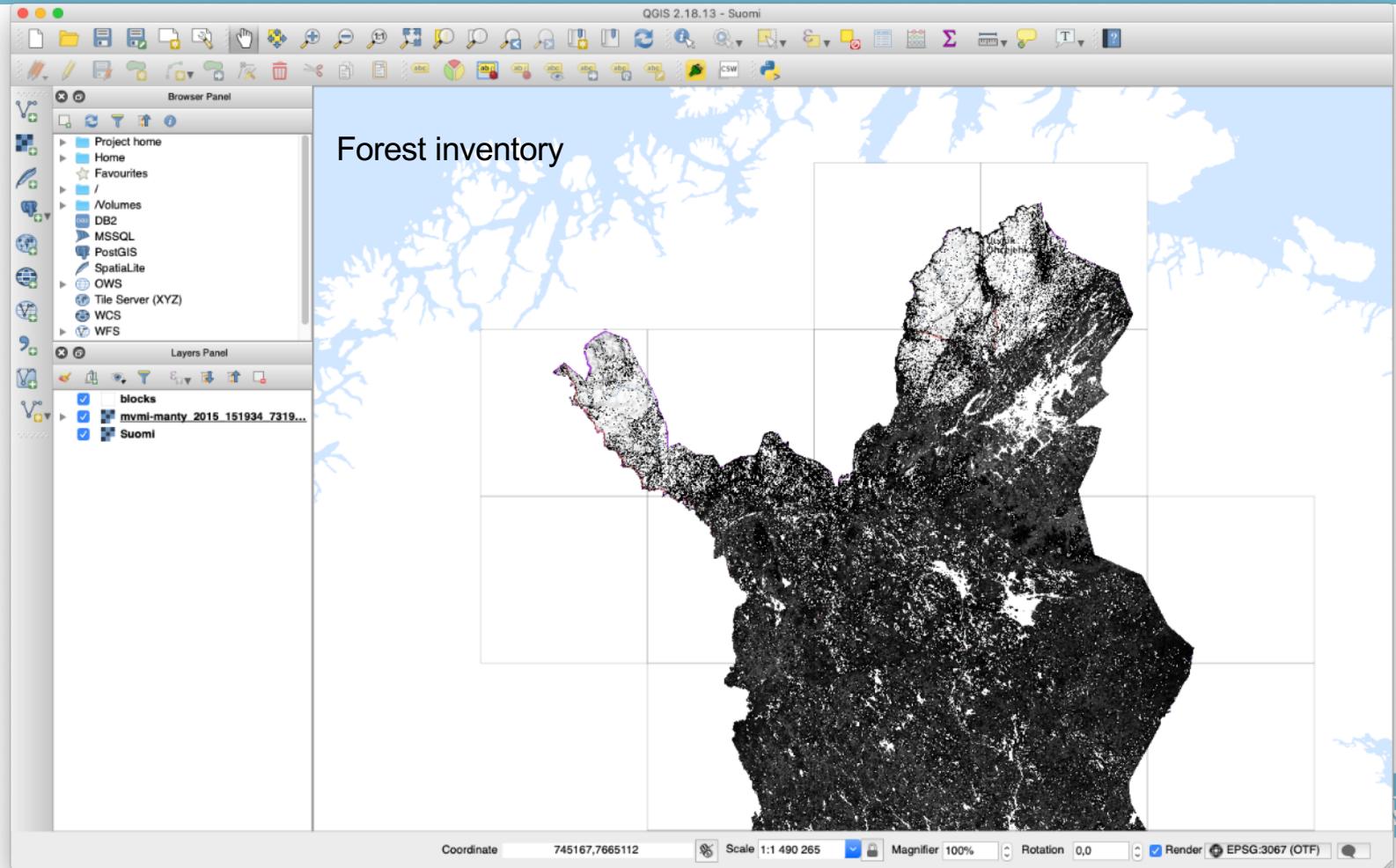
Rotation 0,0

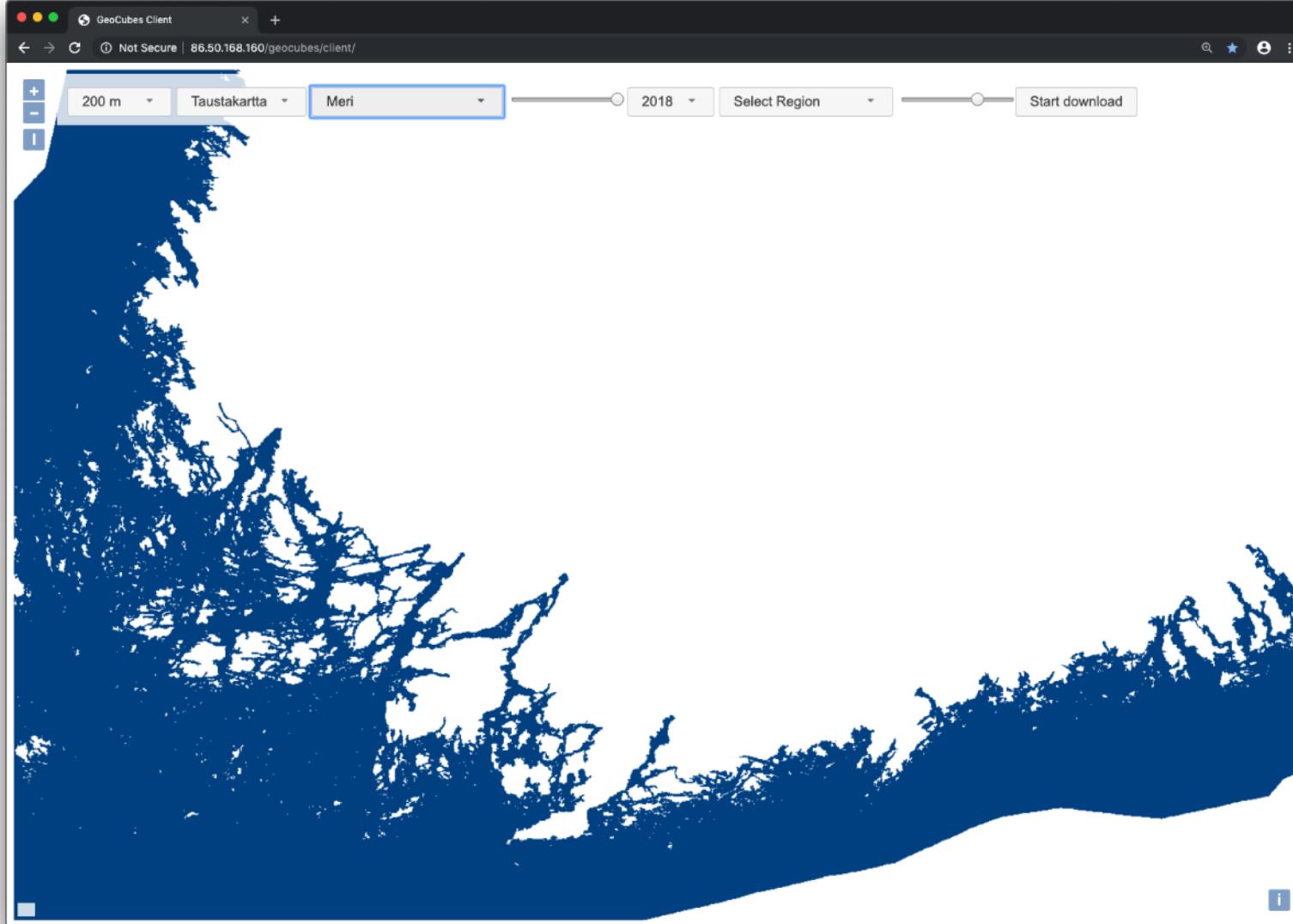


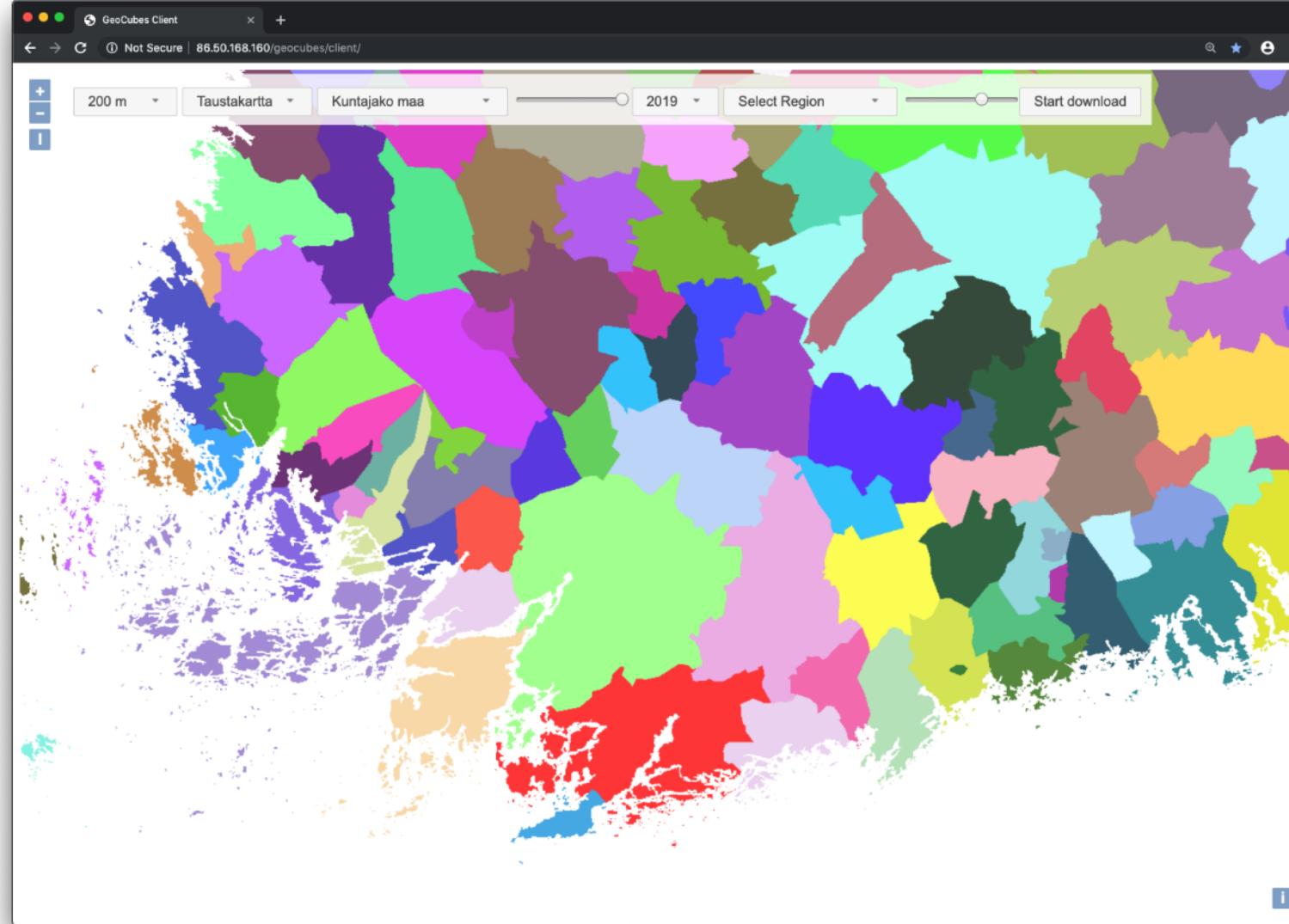
Render EPSG:3067 (OTF)

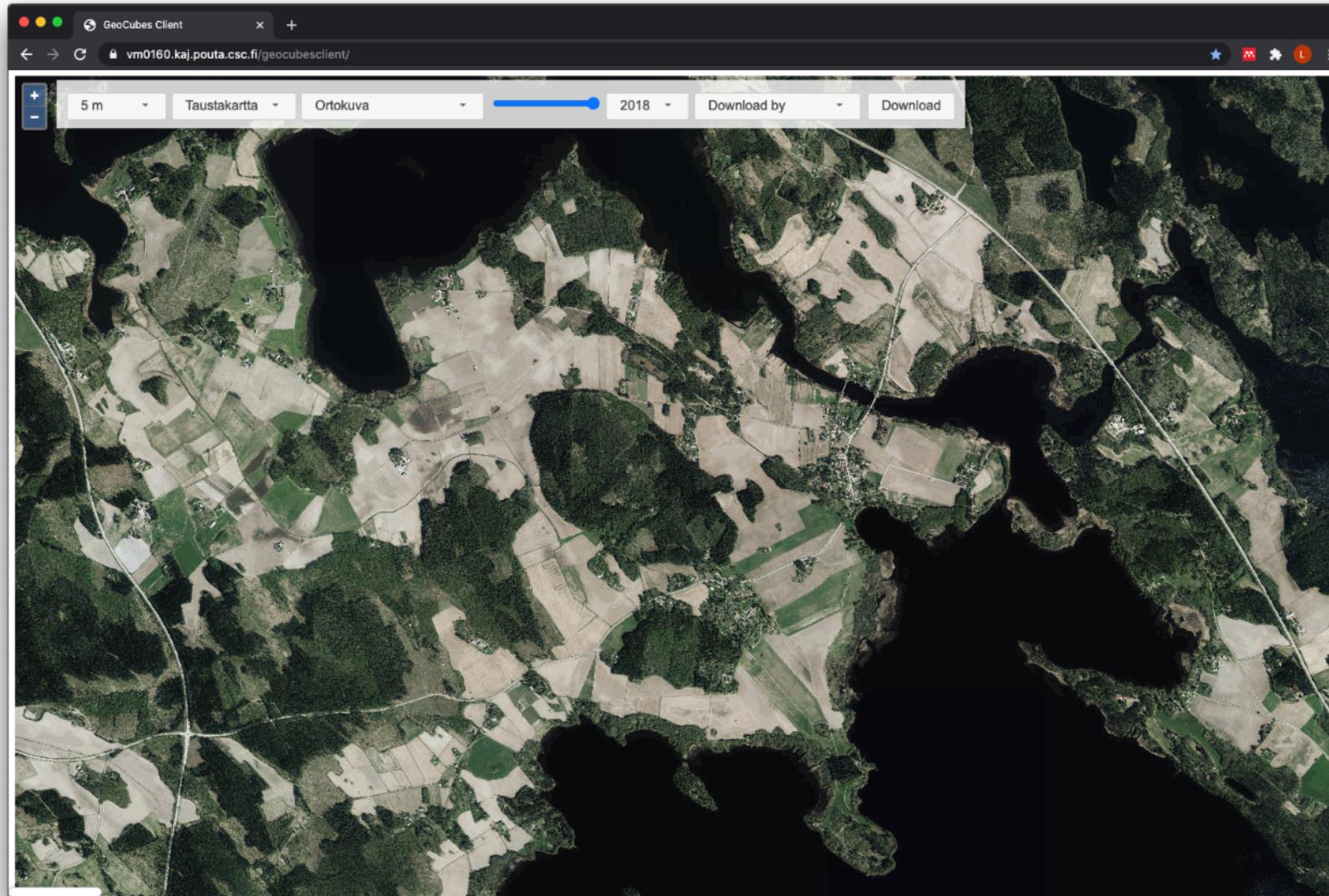


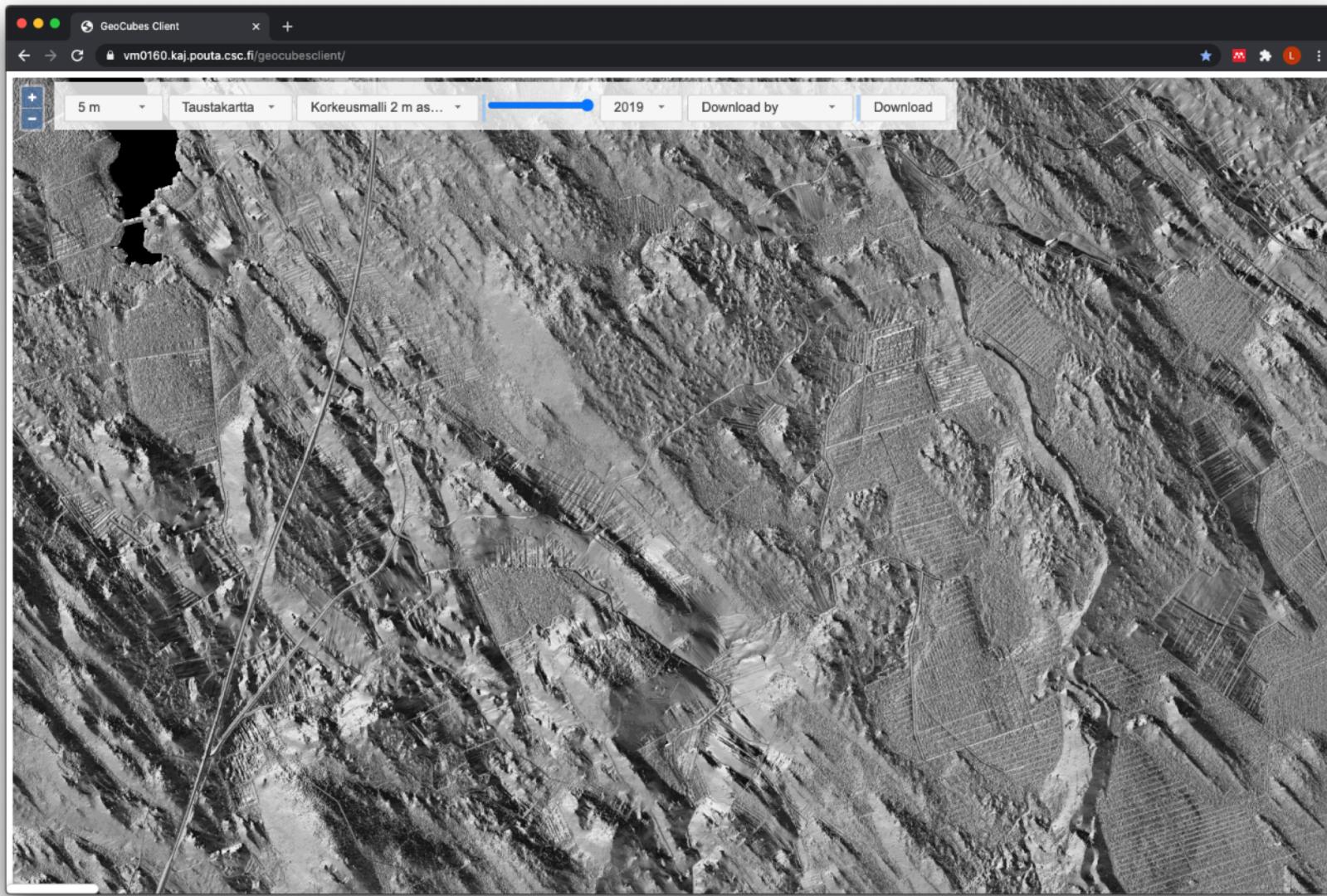


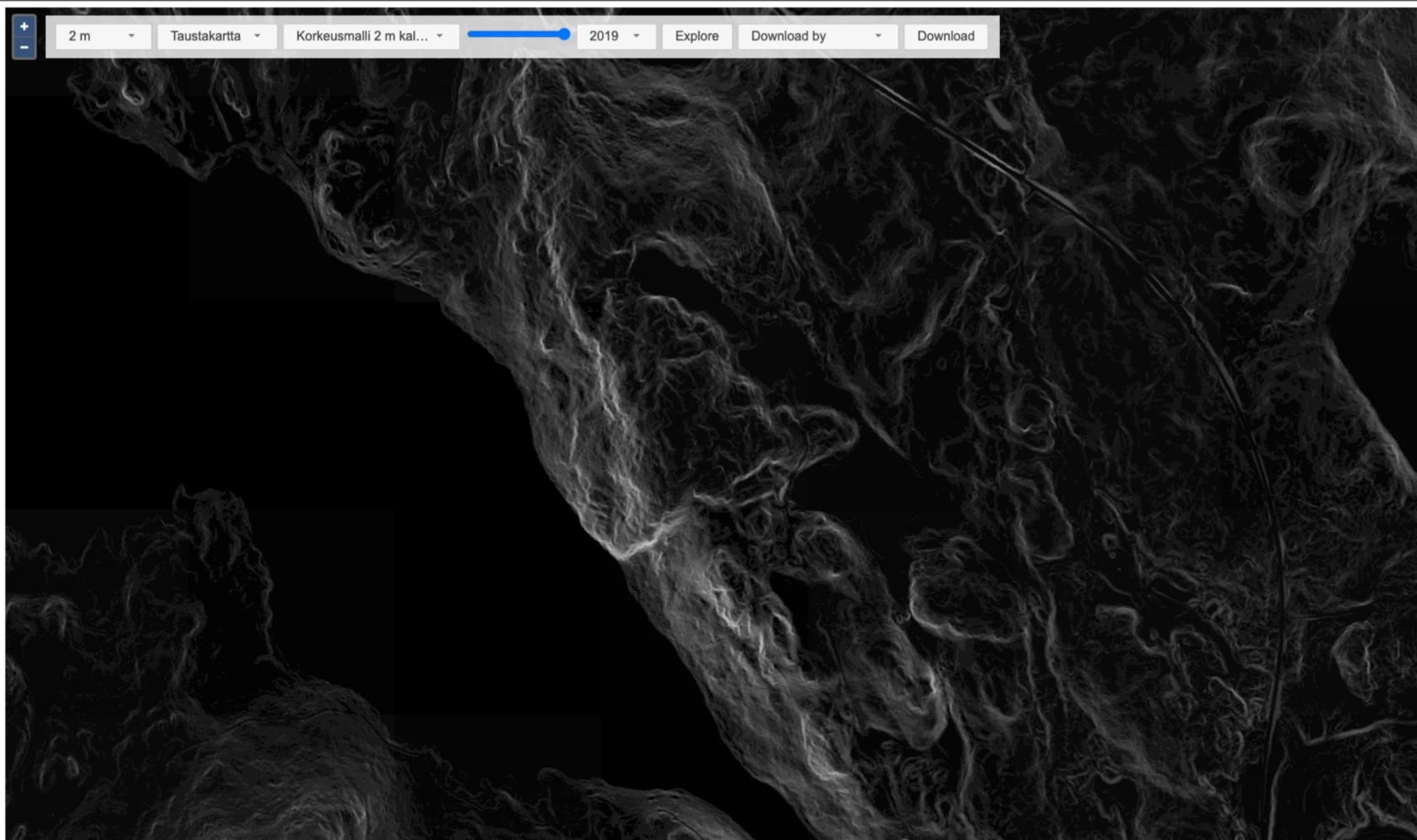


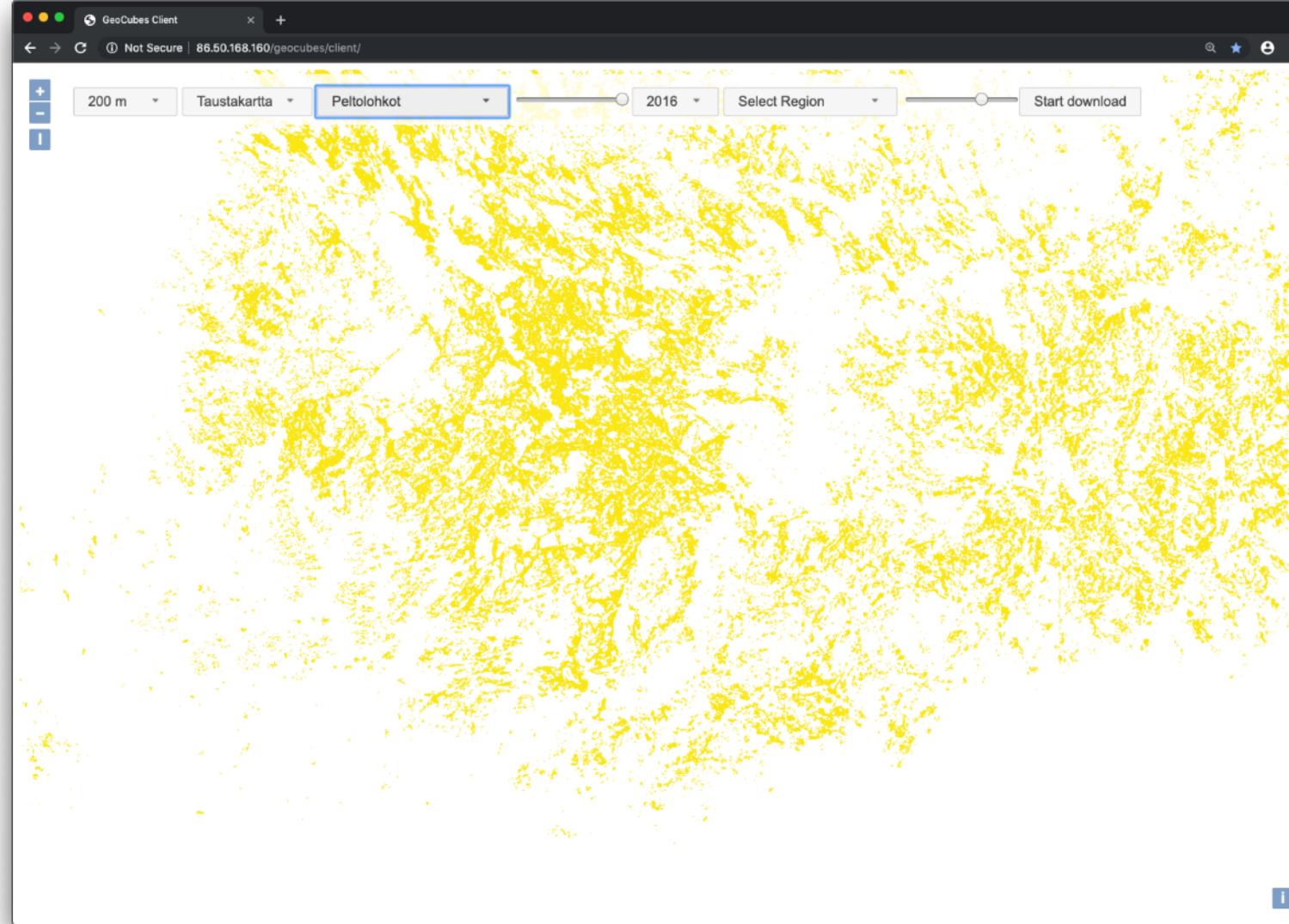


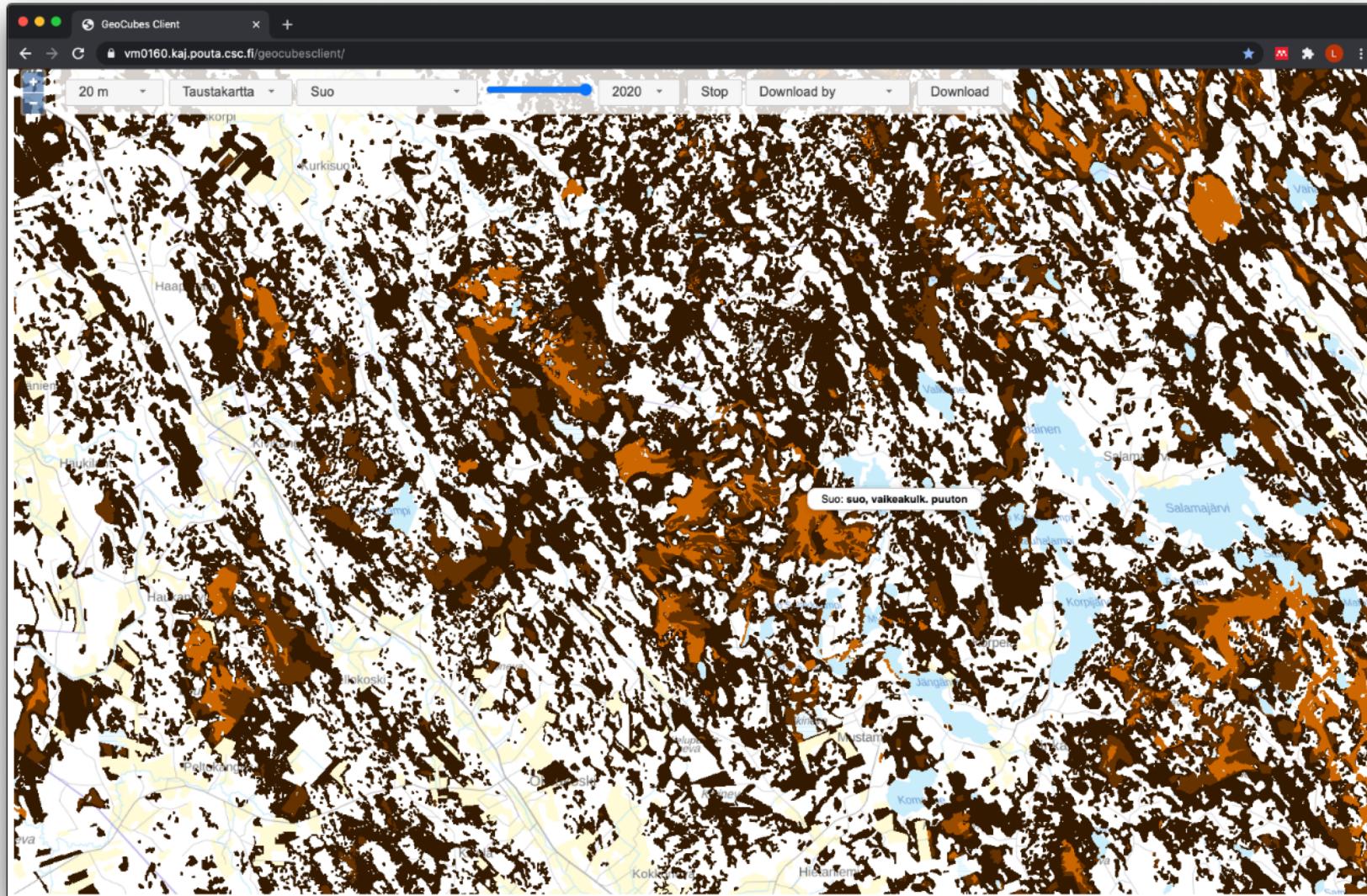










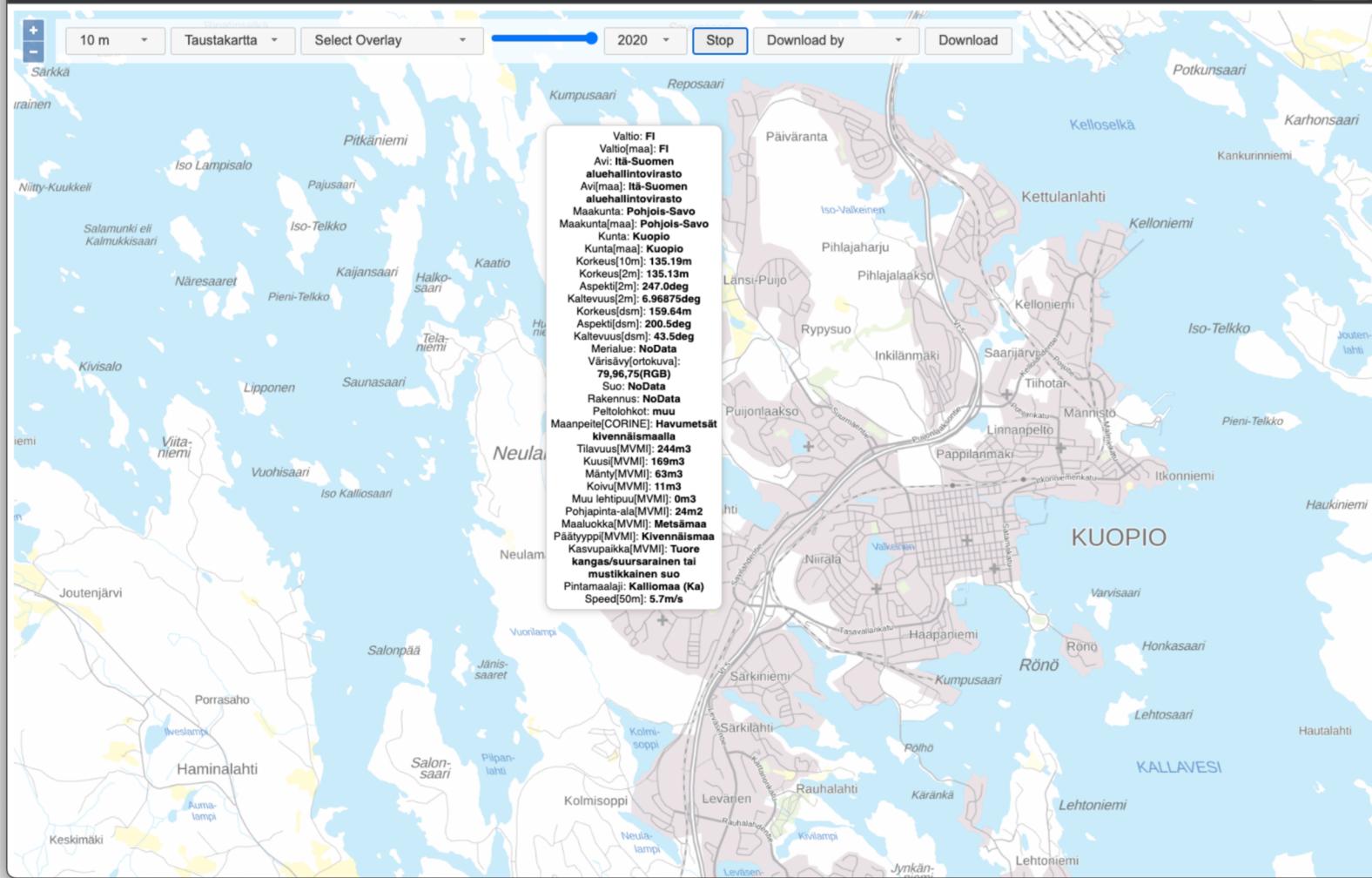


FILE ACCESS URL

- Simple naming syntax
- For example:
 - https://vm0160.kaj.pouta.csc.fi/mml/ortokuva/2022/ortokuva_2022_400000_6800000_500m.tif
 - [https://vm0160.kaj.pouta.csc.fi/
mml/
ortokuva/
2022/
ortokuva_2022_400000_6800000_500m.tif](https://vm0160.kaj.pouta.csc.fi/mml/ortokuva/2022/ortokuva_2022_400000_6800000_500m.tif)

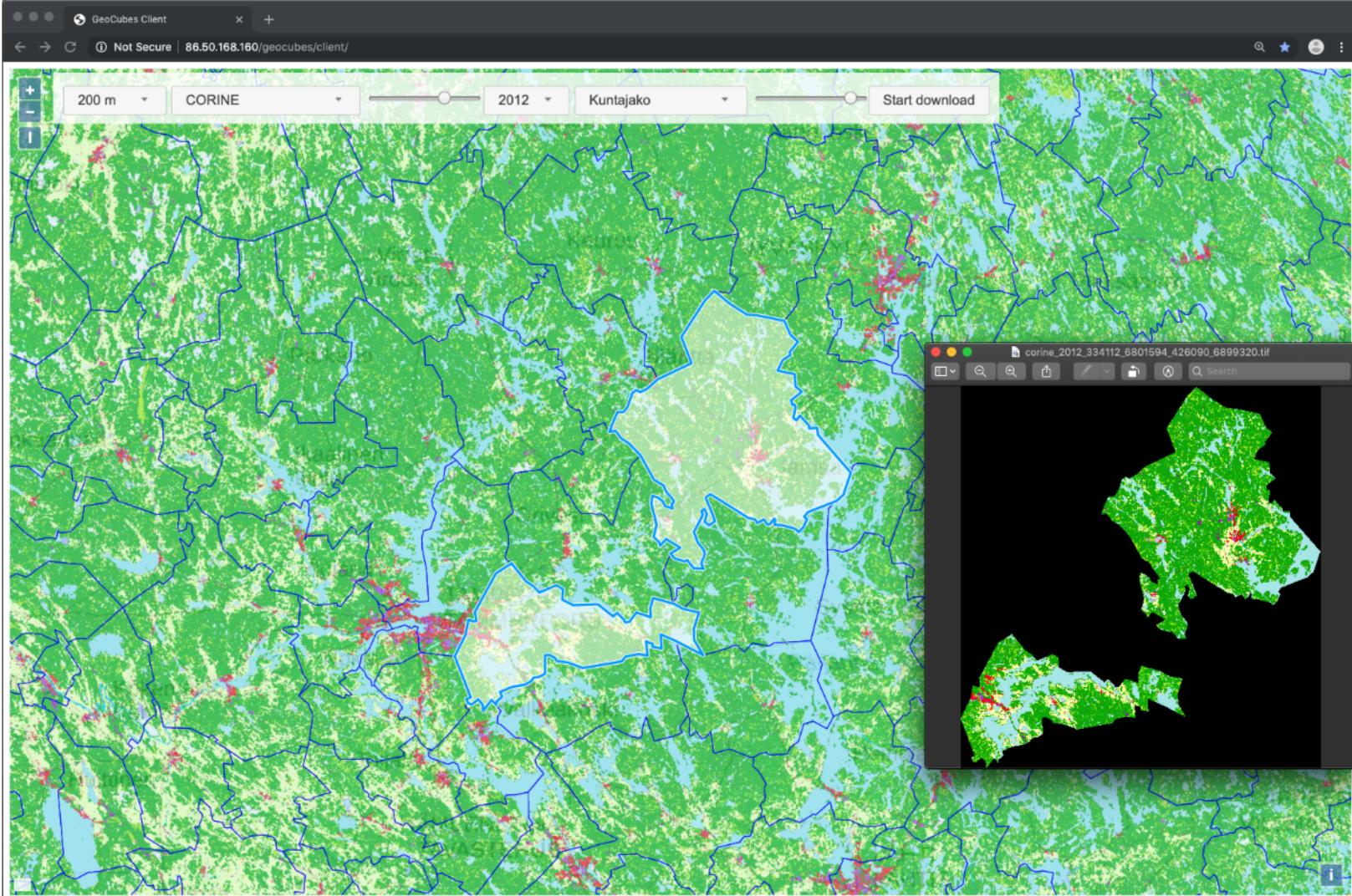
GEOCUBES API

- **what to do /**
- **on which resolution level /**
- **with which content layer /**
- **where /**
- **when /**
- **how**
- **/legend/1/all/389445,6759833/2016**



GEOCUBES API, EXAMPLES

- `/info/getDatasets`
- `/legend/listLabels/corine`
- `/clip/200/corine/kuntajako:734,761,834,433,224,444,927/2012`
- `/clip/200/maapera/bbox:203300,6653400,494700,6784600/2009/vrt`
- `/clip/20/km10/blocks:300000,6900000,300000,6800000/2018/vrt:mr`
- `/clip/50/mvmi-koivu/ polygon:386349,6900916,414254,6844794,497663,6848714, 521186,6904055,509403,6963231,452358,6964027,405703,6960192, 386349,6900916/2009`

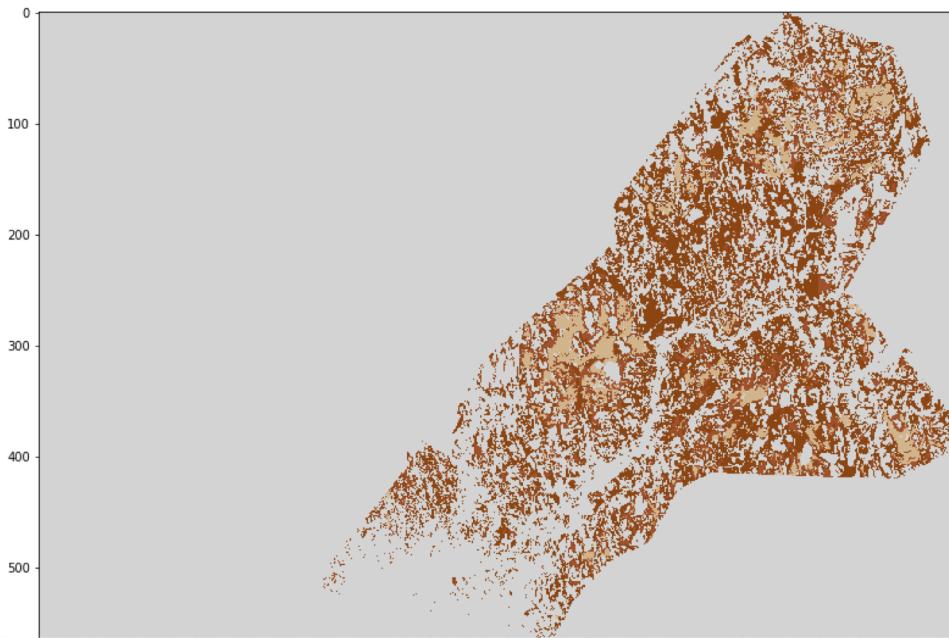


```
In [61]: from rasterio.io import MemoryFile
from urllib.request import urlopen
import numpy as np
import matplotlib.pyplot as plt
from matplotlib.colors import ListedColormap
```

```
In [63]: with urlopen("https://vm0160.kaj.pouta.csc.fi/geocubes" \
    "/clip/100/suo/kuntajako:Simo/2020") as response_suo:
    content_suo = response_suo.read()
    with MemoryFile(content_suo) as memfile_suo:
        with memfile_suo.open() as dataset_suo:
            data_suo = dataset_suo.read(1)
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In [64]: cmap1 = ListedColormap(['white','lightgrey'])
cmap2 = ListedColormap(['lightgrey', 'saddlebrown', 'sienna', 'peru', 'tan'])
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In [65]: fig, ax = plt.subplots(figsize=(15,15))
plot = ax.imshow(data_suo, cmap=cmap2)
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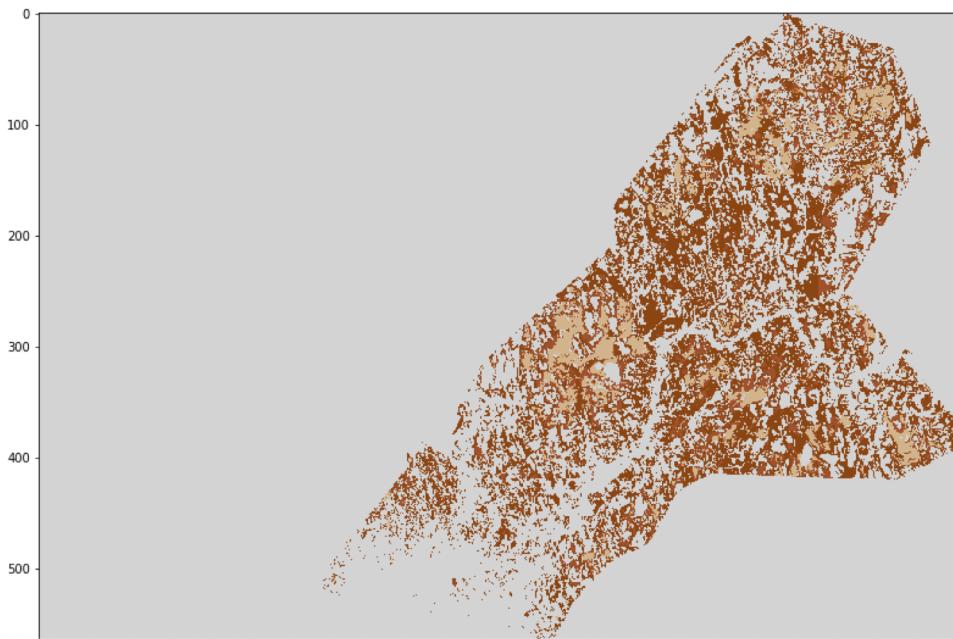


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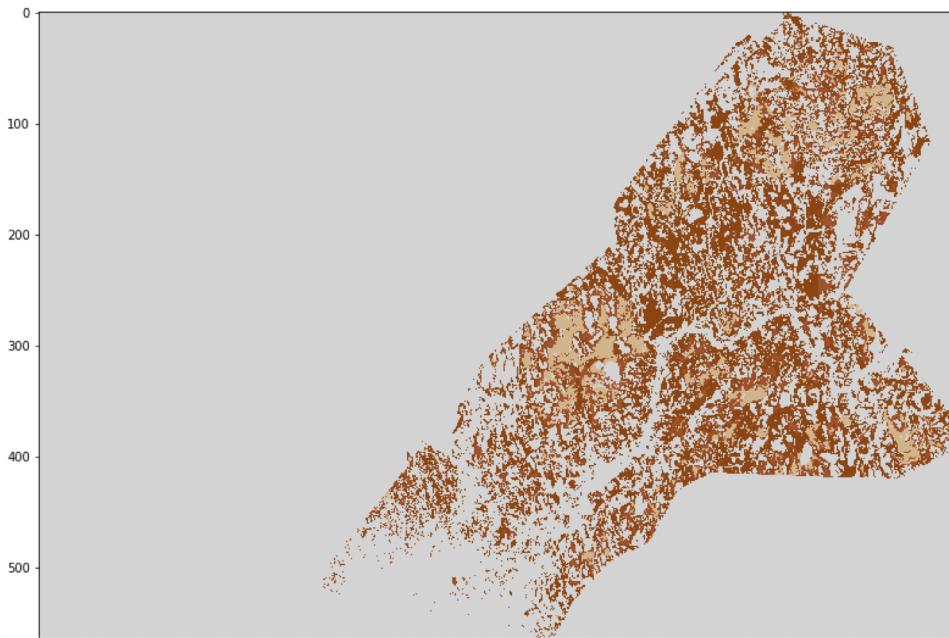
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CONCLUSIONS

- Easy-to-use harmonised, multi-layer, multi-resolution raster data storage, aimed at research community
- Several standardized access mechanisms
- Custom API for flexible access and exploration
- Future work involves
 - Importing more content layers (SYKE)
 - Expansion to the European context

HOW TO FIND

- <https://vm0160.kaj.pouta.csc.fi/geocubes>
- GeoPortti.fi → Data → Find & Get Data → GeoCubes

THANK YOU!

lassi.lehto@nls.fi

