PalTuli spatial data in Puhti

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14.12.2022
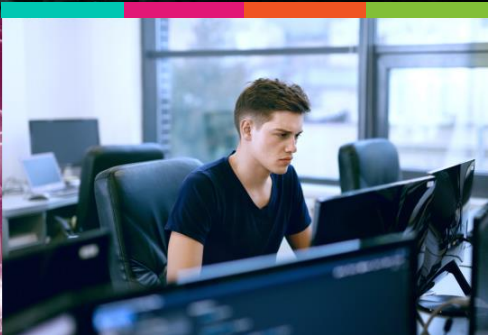
PaITuli

- www.csc.fi/paituli

- Open to everybody, but targeted for academic users

- Data of Finland, mostly from governmental organizations

- Finnish universities and research institutes can share own data

- Includes historical versions of data (2005 ->)

- Main statistics: 13 Tb data, 266 datasets, 2600+ users

- CSC operates the service, Ministry of Culture and Education supports the service, free of charge for end-users

PalTuli datasets

Paituli datasets producers

- Finnish Digital and Population Data Services Agency

- Finnish Food Agency

- Finnish Meteorological Institute (FMI)

- Finnish Transport Infrastructure Agency, Digiroad

- Institute for the Languages of Finland (KOTUS)

- Latuviitta

- National Land Survey (MML)

- Natural resource institute Finland (LUKE)

- Statistics Finland

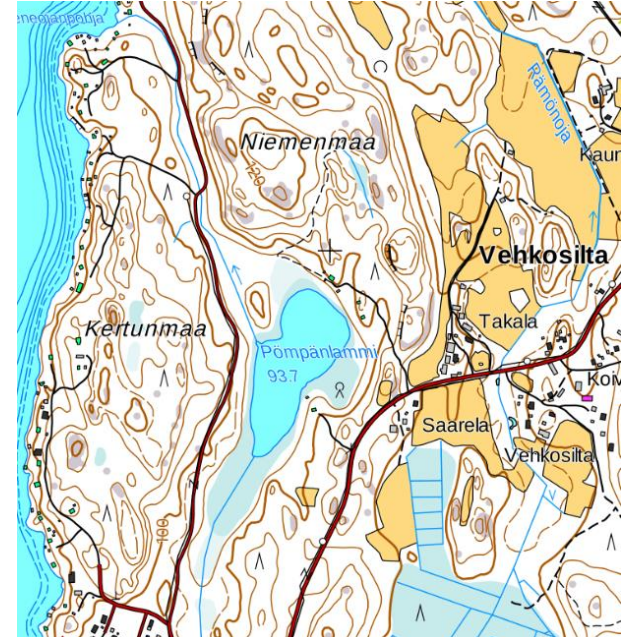- University of Helsinki, Digital Geography Lab
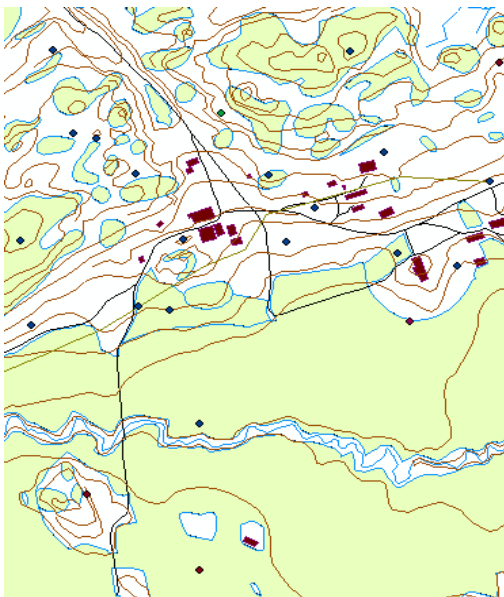
- 1:20 000
- 2005->
- PNG, TIFF

NLS, basic map

Background color

Print color

NLS, topographic database

- 1:10 000
- 2005->
- SHP for map sheets
- GeoPackage all Finland in one thematic file
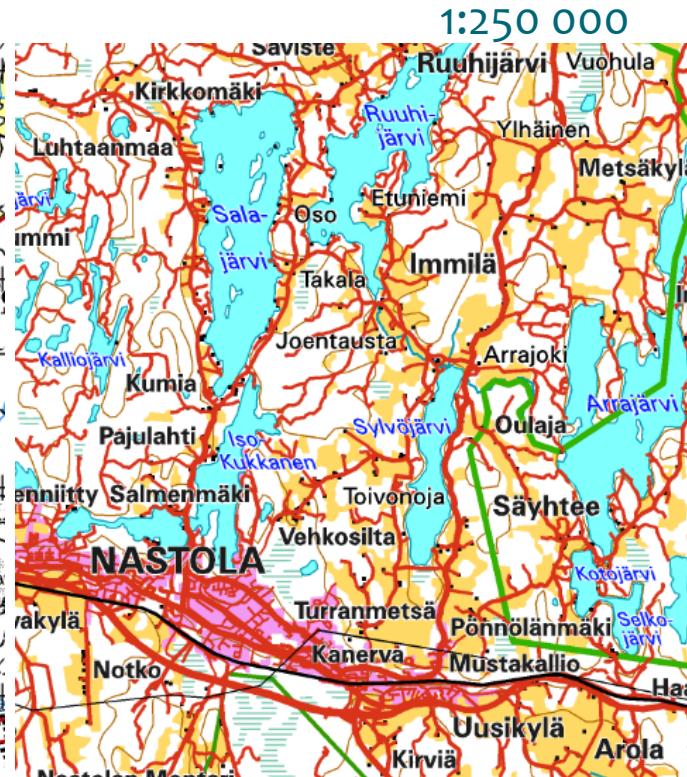

© Maanmittauslaitos 2010

- Traffic
  - Road, streets, tracks, railways, ferries, airports

- Buildings

- Administrative borders

- Place names

- Land use

- Water
  - Sea, lakes, rivers, streams, springs

- Contours, height and depth

- ...

- 1:50 000 – 1:4 500 000
- 2005->
- PNG/TIFF, SHP

NLS, topographic and general maps

1:50 000

1:250 000

- 1:10 000
- 1997->
- JPG2000
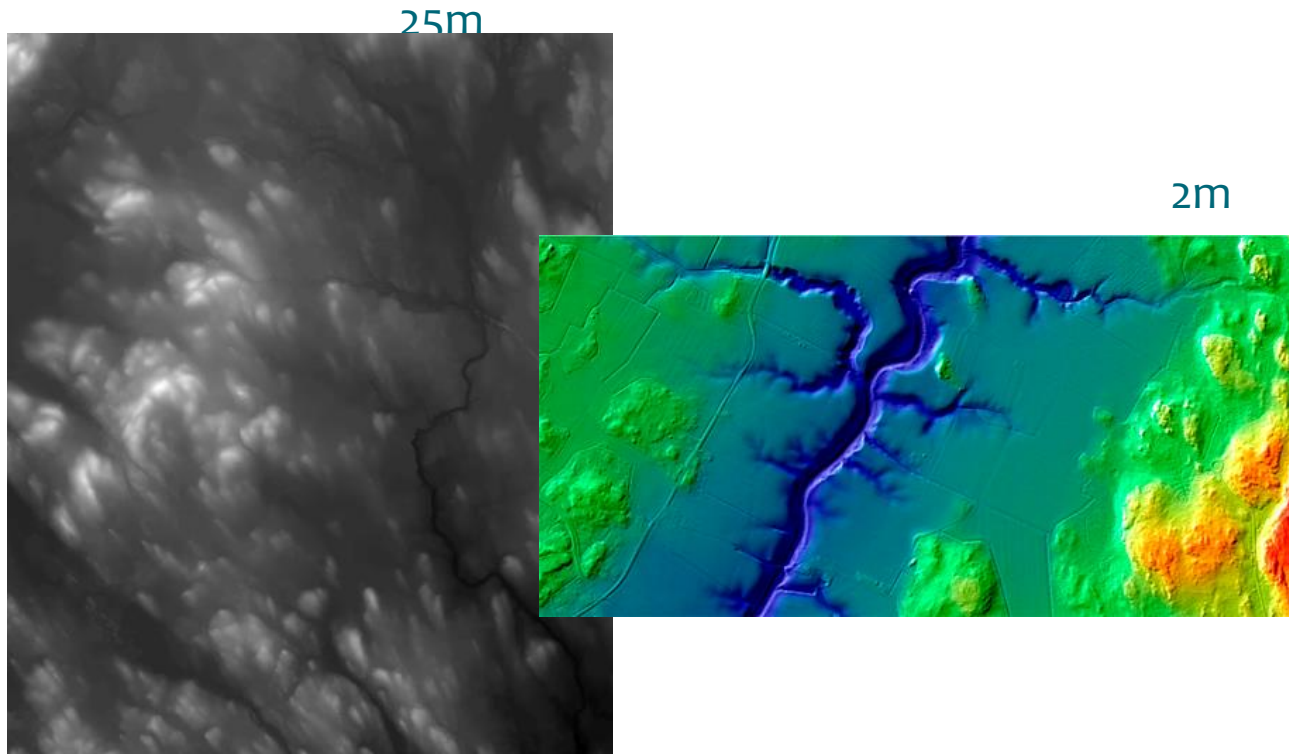
NLS, ortho images

Normal color

Infrared

Black-and-white
(some old images)

- 25m, 10m and 2m
- TIFF

NLS, DEM, digital elevation model

25m
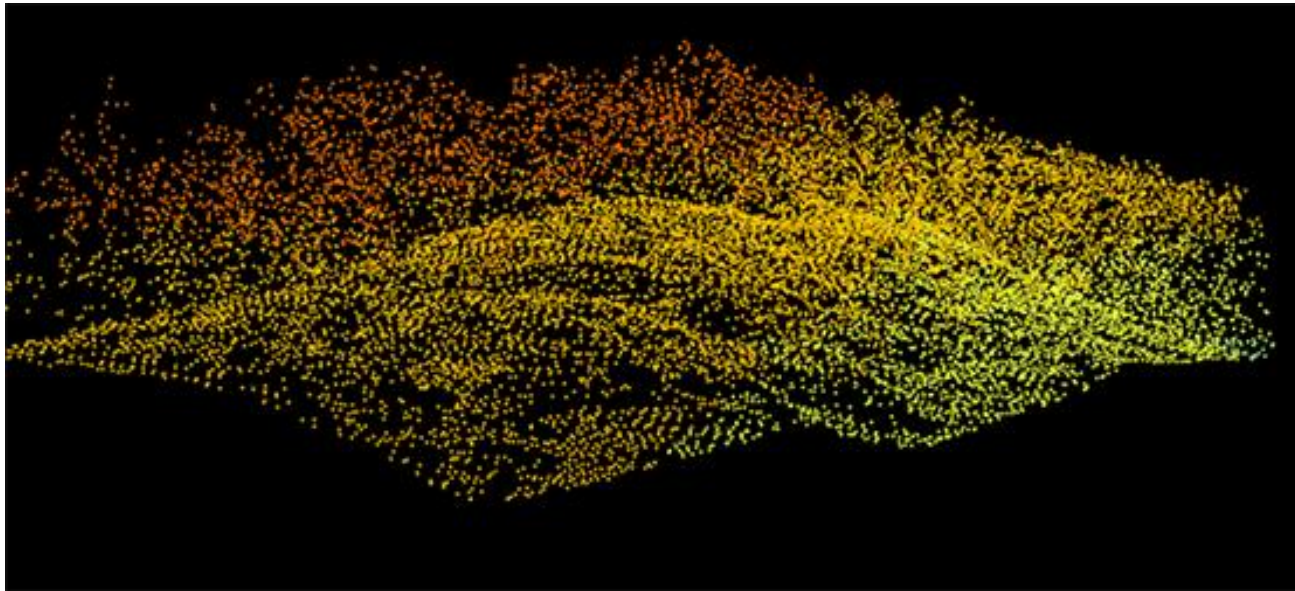

2m
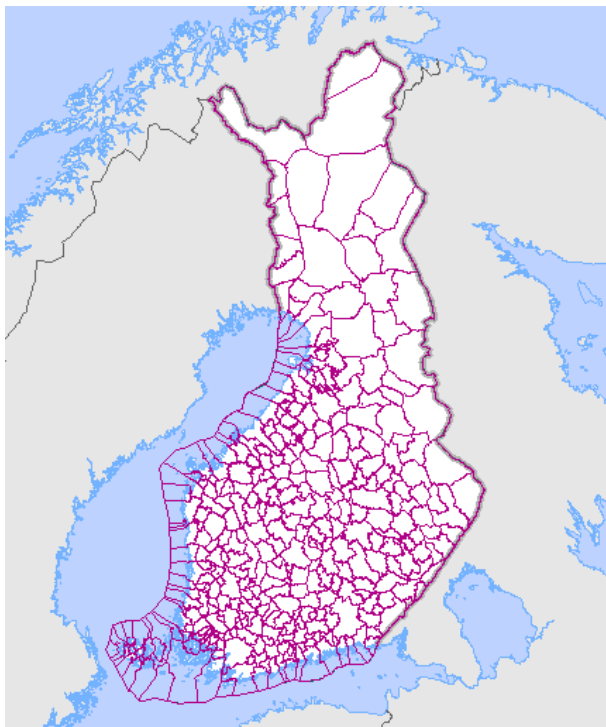
- 0,8 points / m2
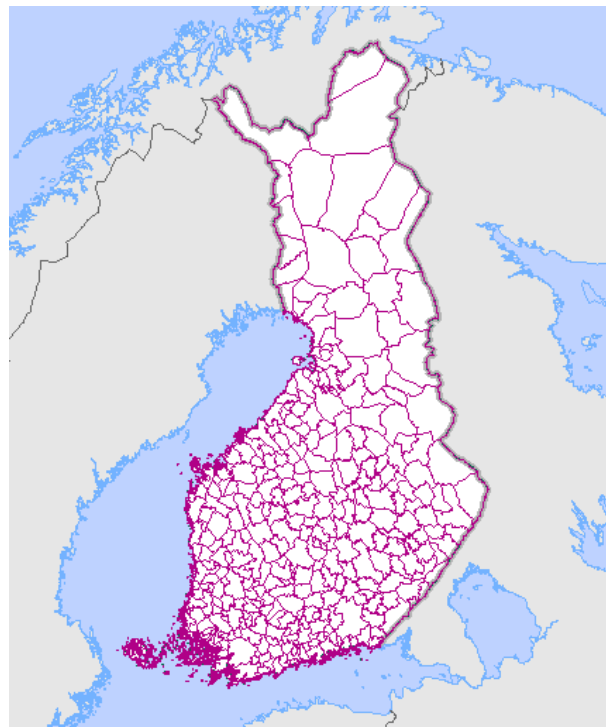- 2008->
- LAZ

NLS, lidar

- 1:10 000 – 1:1 000 000
- 2005->
- SHP

NLS, administrative borders

1:10 000

1:1 000 000, for thematic maps
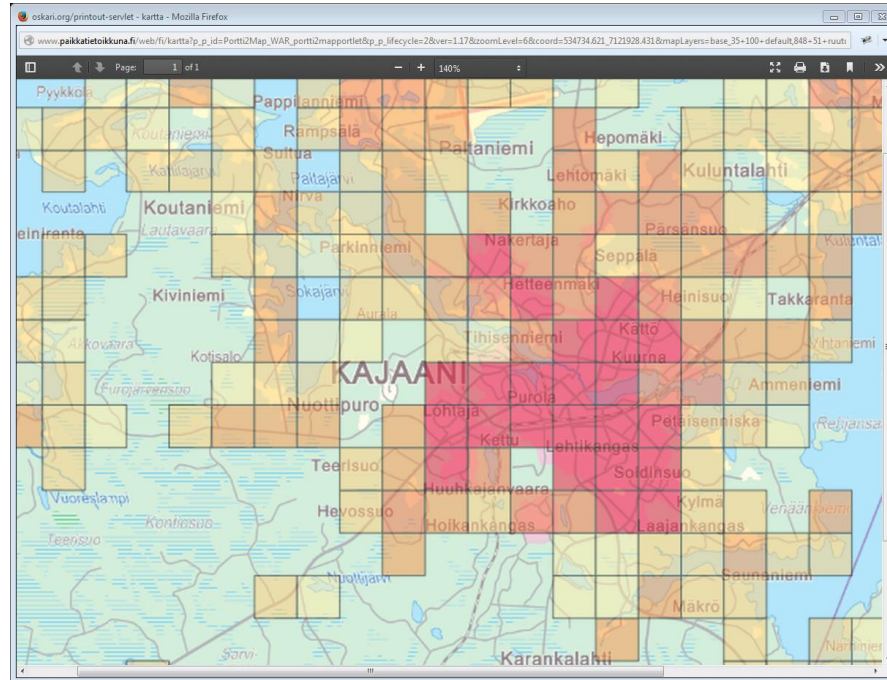

© Maanmitt...

- 1:10 000
- 2006->
- SHP + DBF

Finnish Transport Infrastructure Agency, Digiroad

csc

- Roads and streets
- Addresses -> **geocoding**
- Speed limits, turning restrictions etc -> **routing**
- Bridges and tunnels
- Parking areas and houses
- Bus stops
- ...

- 1 x 1 km
- 2005, 2010-2018
- SHP

Statistics Finland, Population grid data

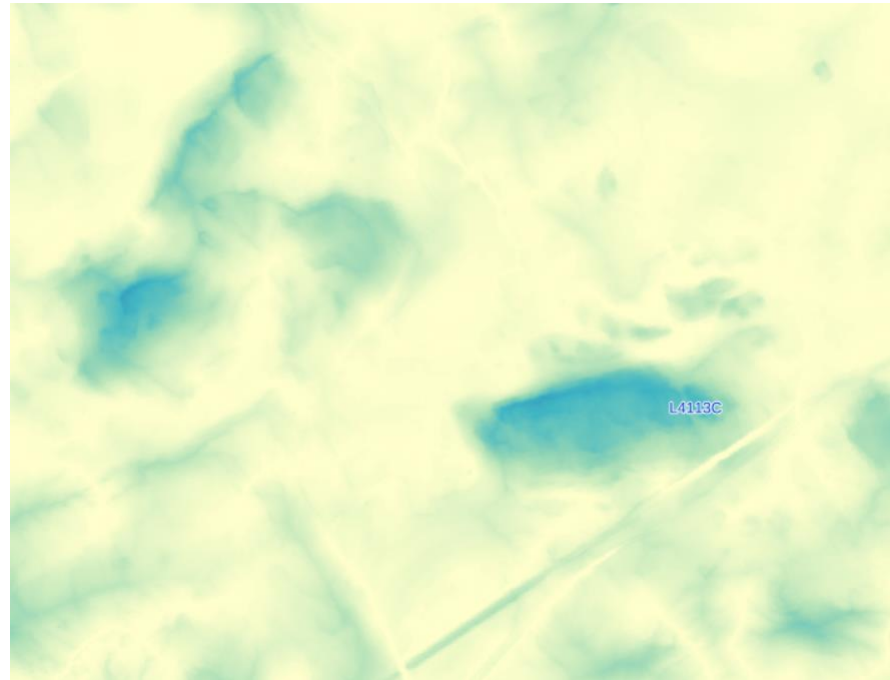© Tilastoke

FMI

- 10 x 10 km
- 1961->
- TIFF, NetCDF

- Min and max temperature
- Air pressure
- Snow depth
- Relative humidity
- Radiation
- etc

Average temperature

Precipitation

LUKE, DTW-depth-to-water index map

- 2 x 2 m
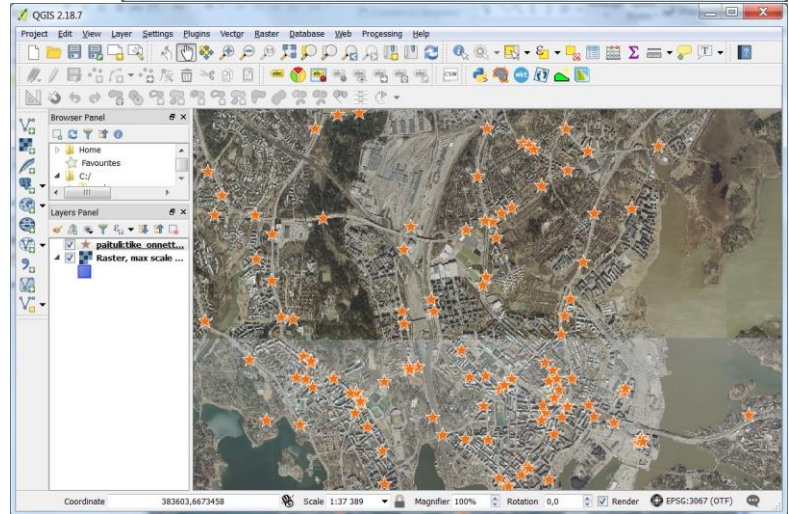- 2014-2019
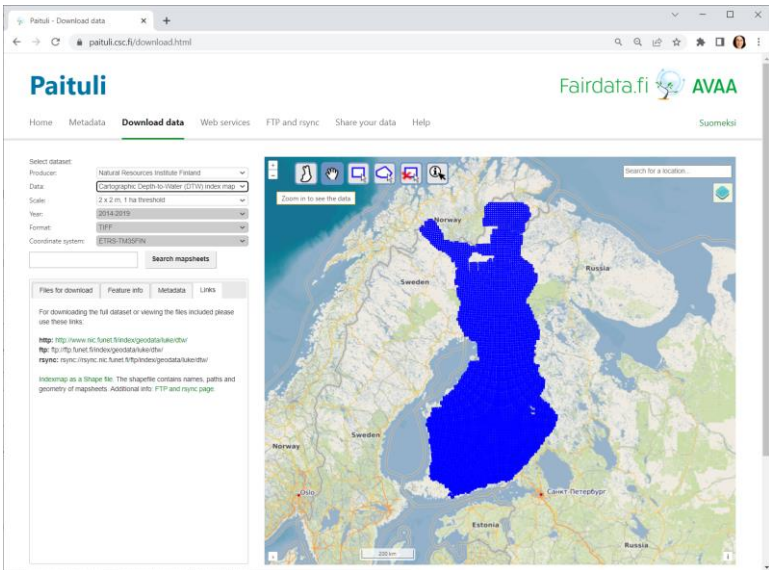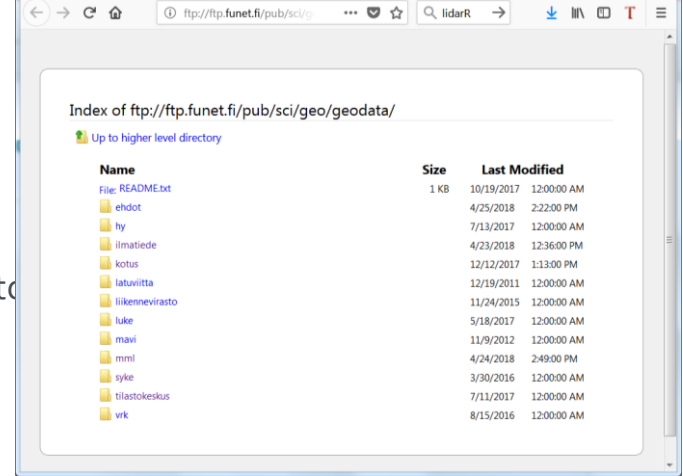- TIFF

Non-PalTuli data in Puhti

- **LUKE, multi-source national forest inventory**, 2013, 2015, 2017 and 2019.

- **SYKE, All open spatial datasets** available from <u>SYKE open data service</u>.

- **Finnish Forest Centre, <u>Canopy height model, 2021</u>**

- **Satellite mosaics produced by SYKE and FMI** in Paikkatietoalusta project,
  - <u>Sentinel1 SAR mosaics</u>: 10/2019 ->, 3 mosaics per month
  - <u>Sentinel2 index mosaics</u>: 2018 ->, 2 mosaics per month, only during vegetation period, NDVI, NDBI, NDMI, NDTI, META.
  - <u>Historical Landsat satellite image mosaics</u>: 1985, 1990, 1995
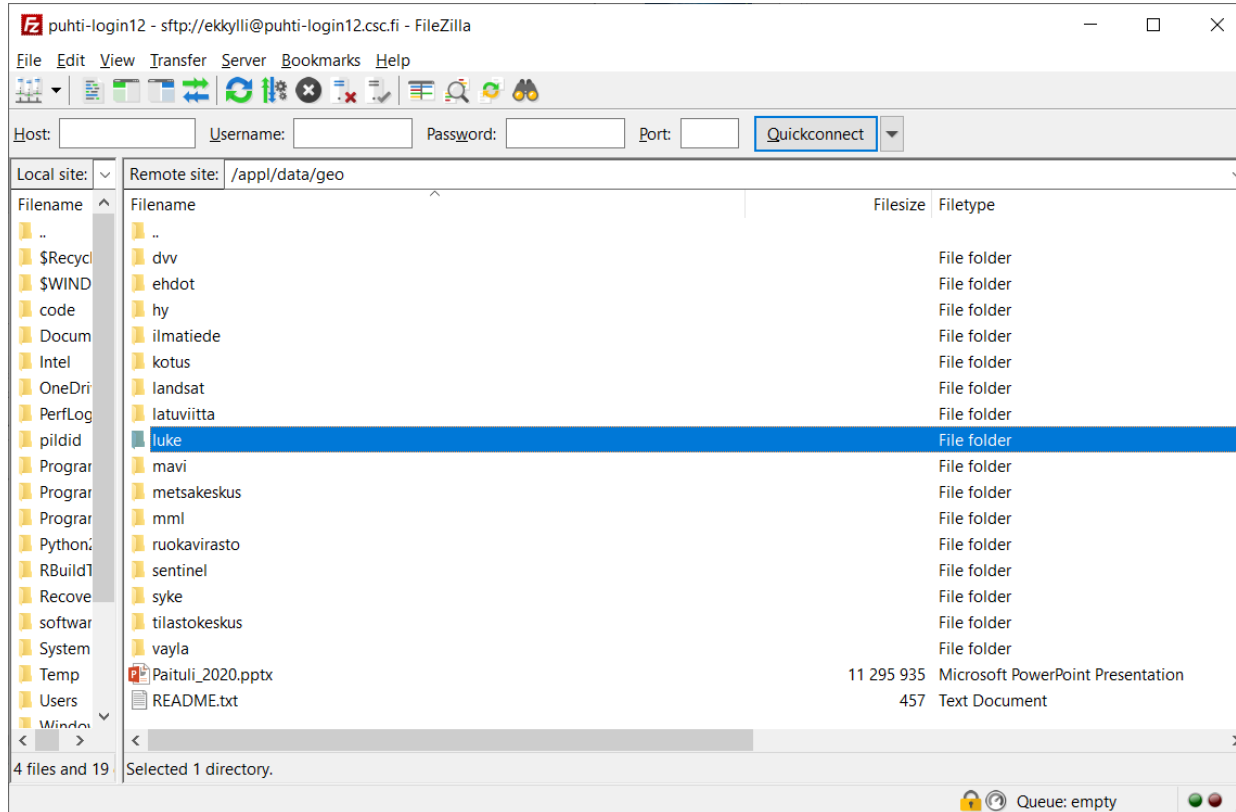 - <u>Historical Landsat NDVI mosaics: 1984-2011</u>

Data access

Paituli download / usage options

1. Files as zip from Paituli web service

2. APIs: WFS, WCS, WMS, WMTS, new OGC APIs

3. Files batch download - https/ftp/rsync: curl, wget, Python, R etc.

4. Puhti

Paituli files in Puhti supercomputer

https://docs.csc.fi/data/datasets/spatial-data-in-csc-computing-env/#spatial-data-in-puhti

How to find the file path in Puhti? /appl/data/geo

Virtual rasters for big raster datasets

- Originally GDAL concept, works with many GDAL-based tools, inc R and Python.

- Use not overlapping map sheets as if they would be one big file.

- Technically small XML-file .vrt that refers to actual data files.

- https://docs.csc.fi/support/tutorials/gis/virtual-rasters/
  - Code examples for GDAL commandline tools, R raster/terra and Python rasterio.

- Used in:
  - Puhti NLS DEMs and infrared orthophotos:
    https://docs.csc.fi/data/datasets/spatial-data-in-csc-computing-env/#puhti-virtual-rasters
  - GeoPortti GeoCubes
  - FMI STAC for some datasets

Virtual drivers = reading data directly from URL

- Originally GDAL concept, works with many GDAL-based tools, inc R and Python.

- **VSICURL**, any URL, usually public URLs, but also credentials possible

- https://gdal.org/user/virtual_file_systems.html#vsicurl-http-https-ftp-files-random-access

- Examples:

> GeoCubes DEM10 VRT in cPouta:
> gdalinfo /**vsicurl**/https://vm0160.kaj.**pouta**.csc.fi/mml/korkeusmalli/km10/2018/km10_2018_10m.**vrt**
>
> Sentinel2 one file in Allas:
> gdalinfo /**vsicurl**/https://**a3s.fi**/Sentinel2-MSIL2A-cloud-0-95-2016-T34VDN
> /S2A_MSIL2A_20160516T100032_N0202_R122_T34VDN_20160516T100032.SAFE/GRANULE/L2A_T34V
> DN_A004695_20160516T100032/IMG_DATA/R10m/L2A_T34VDN_20160516T100032_B02_10m.**jp2**

Virtual drivers = reading data directly from S3 (Allas)

- **VSIS3**, S3 object storage, for example AWS or CSC Allas:

- Requires setting up credentials and S3-endpoint

- https://gdal.org/user/virtual_file_systems.html#vsis3-aws-s3-files

- https://docs.csc.fi/apps/gdal/#using-files-directly-from-allas

- Examples:

Sentinel2 one file in Allas :
gdalinfo /**vsis3**/Sentinel2-MSIL2A-cloud-0-95-2016-T34VDN
/S2A_MSIL2A_20160516T100032_N0202_R122_T34VDN_20160516T100032.SAFE/GRANULE/L2A_T34VD
N_A004695_20160516T100032/IMG_DATA/R10m/L2A_T34VDN_20160516T100032_B02_10m.**jp2**