



Spatial data sources

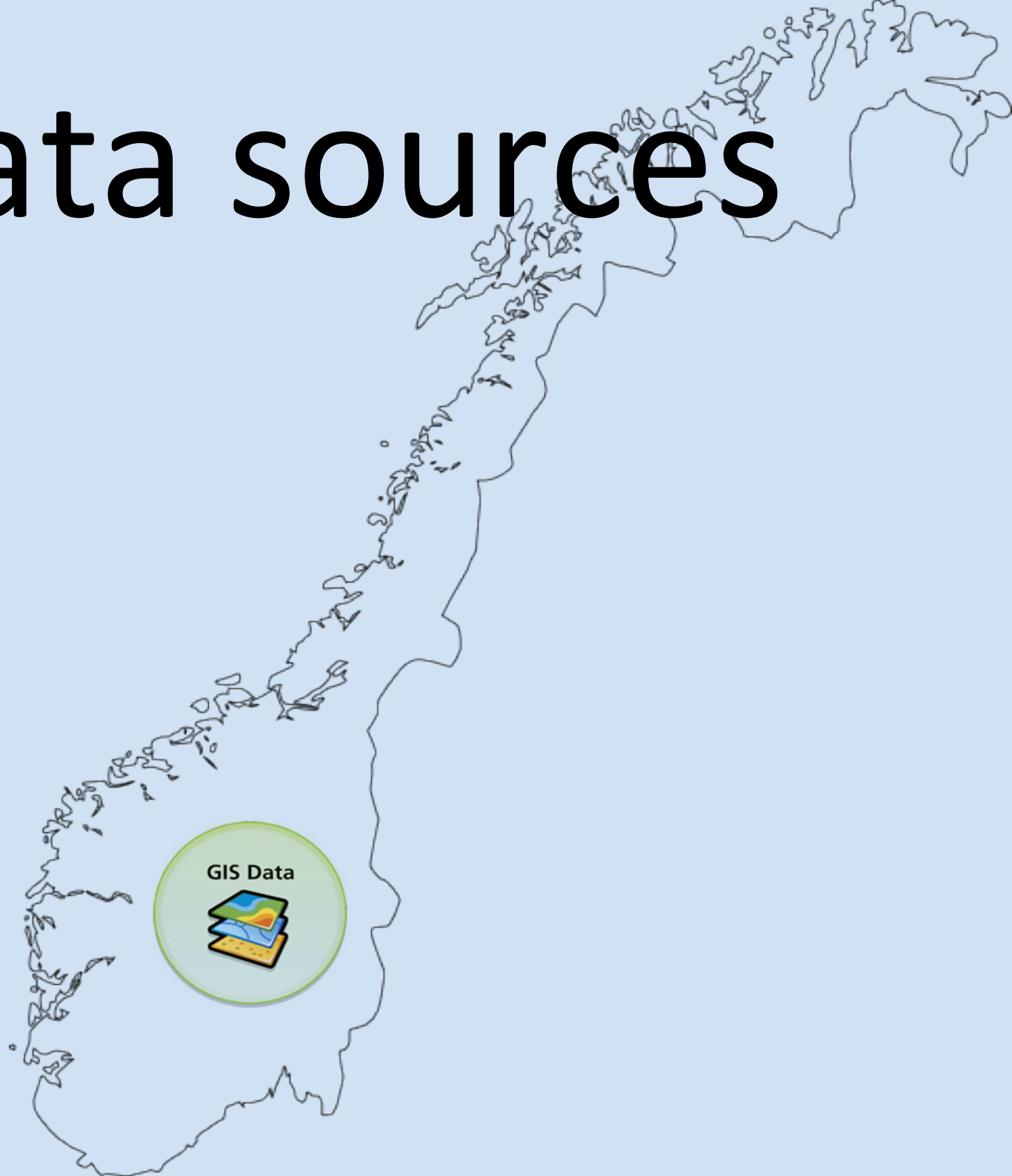
Downloadable spatial data

Topics

- Vector and raster data (shape, geotif)
- Web services (WMS/WFS/WCS)



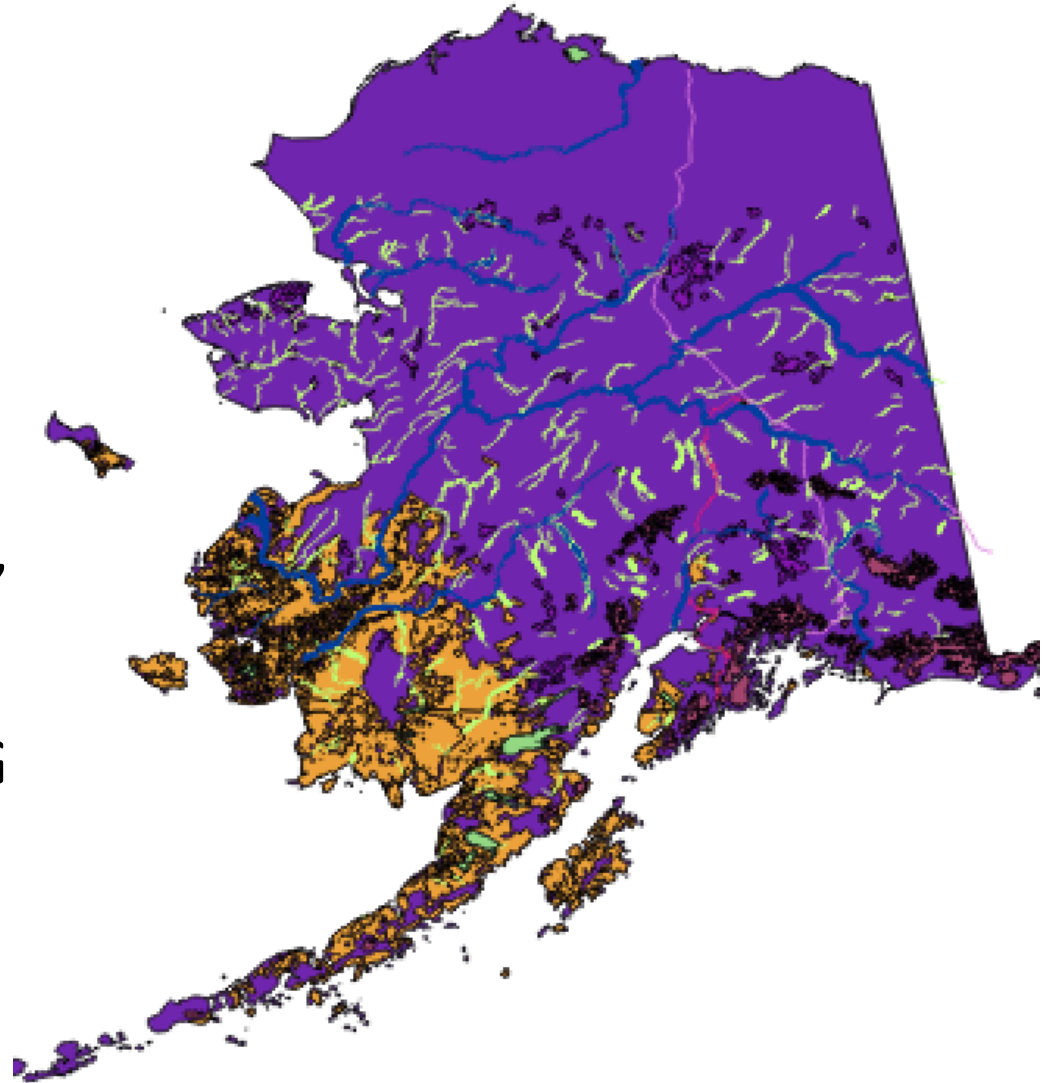
GIS data sources



QGIS Sample Data

- The user guide contains examples based on the QGIS sample dataset.
- Spatial data for Alaska.
- The Windows installer has an option to download the QGIS sample dataset.
- “MyDocuments > GIS Database”
- The projection is Alaska Albers Equal Area with units feet (EPSG 2964).

http://download.osgeo.org/qgis/data/qgis_sample_data.zip



DIVA-GIS data

- DIVA-GIS is a user-friendly open and free Desktop GIS software.
- The homepage provides a useful section with **free spatial data**.
- Global coverage and split into sets by country.
- These datasets are useful as a start for the QGIS exercises in this course.



Country

Norway

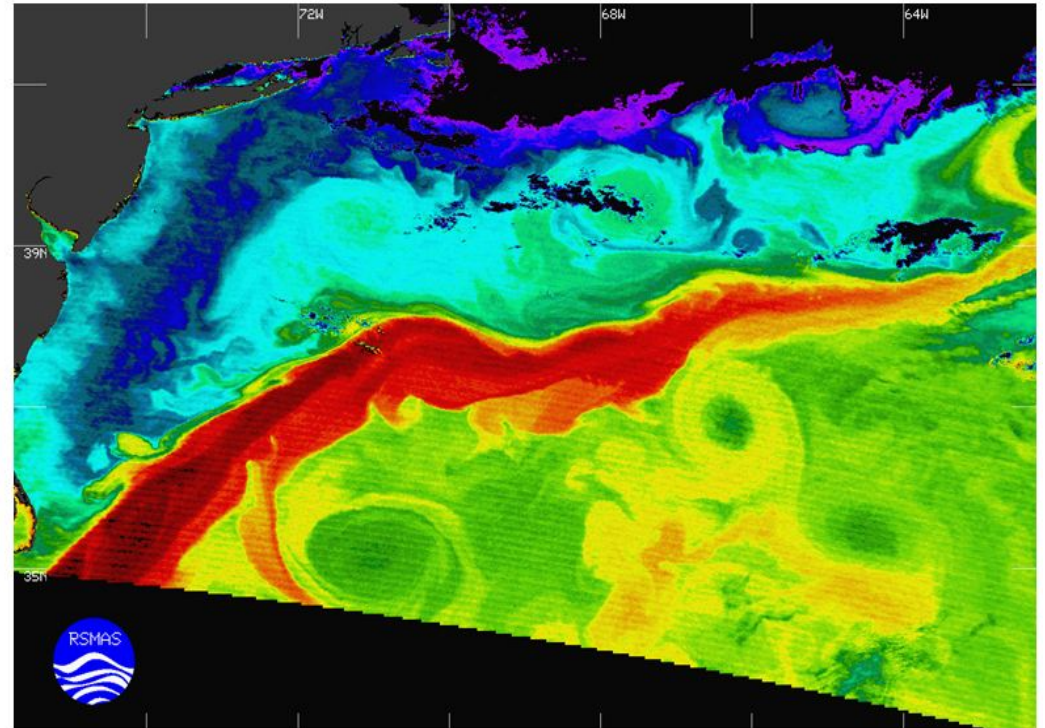
Subject

Administrative areas

- Administrative areas
- Inland water
- Roads
- Railroads
- Elevation
- Elevation (country mask)
- Land cover**
- Land cover (country mask)
- Population
- Population (country mask)
- Gazetteer

Remote Sensing (Satellite)

- Geographers use pictures taken from satellites and sensors to help solve everyday problems.
- Examples include aerial imagery, infrared (IR) and microwave sensors, and sonar, but there are many more!
- This is known as remote sensing

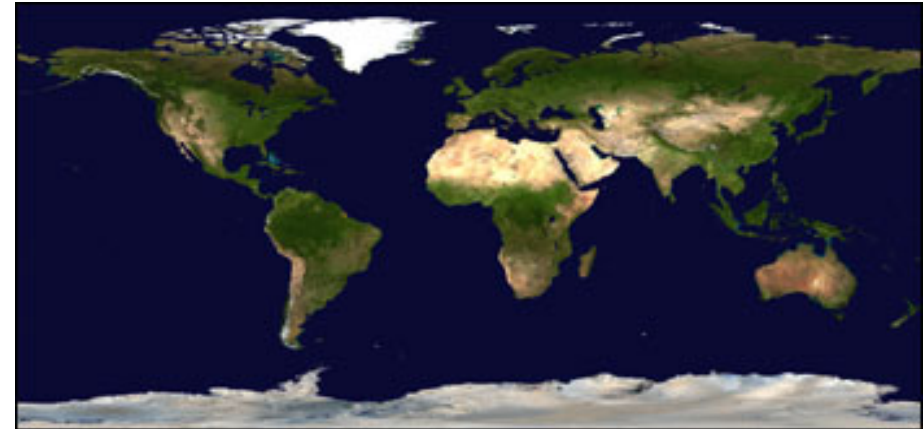


Temperature of the Gulf Stream using Terra Modis satellite, June 28, 2000

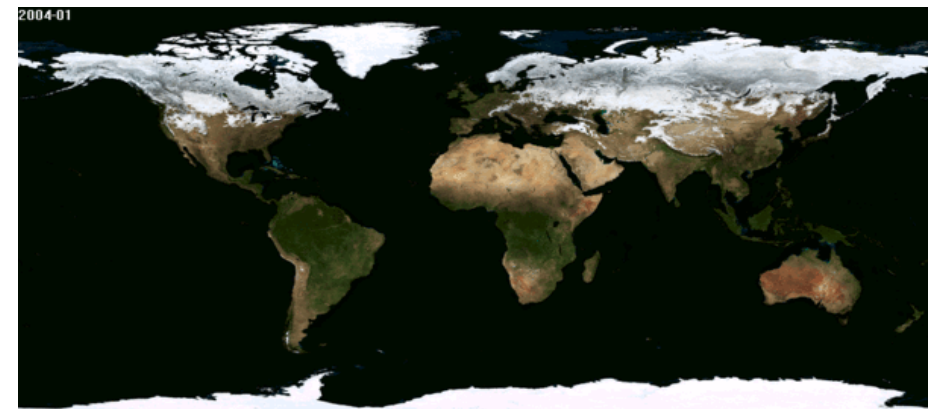
NASA Visible Earth Team ; <http://visibleearth.nasa.gov/>

The **Blue** Marble (NASA)

- **NASA Earth Observatory** released in 2002 high resolution (**1 km/pixel**) photographic satellite data for the entire earth.
- Clean with cloud-cover removed.
- For **FREE** with reuse permitted (Public Domain).
- These satellite images are known as the “**Blue Marble**”.
- A new series of satellite images was released in 2005 and known as the “**Blue Marble Next Generation**”.
- Monthly cloud-free images at even higher resolution (**500 m/pixel**).



Blue Marble (2002).

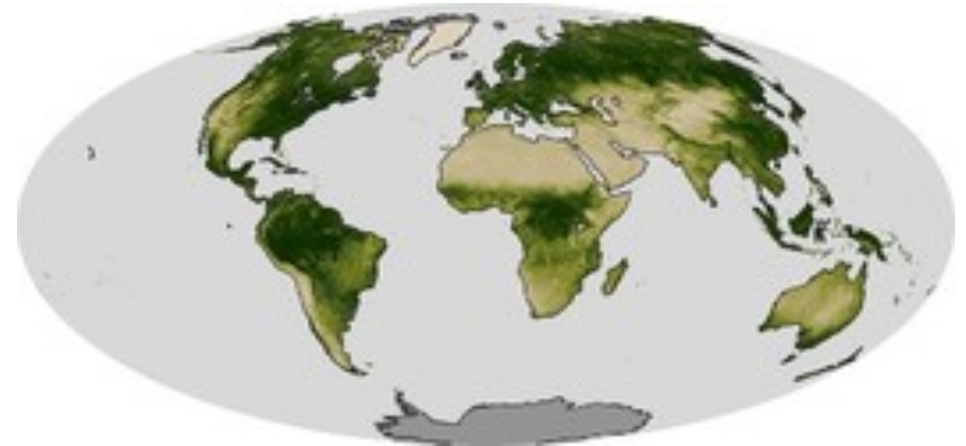


Blue Marble Next Generation - monthly (January to December 2004).

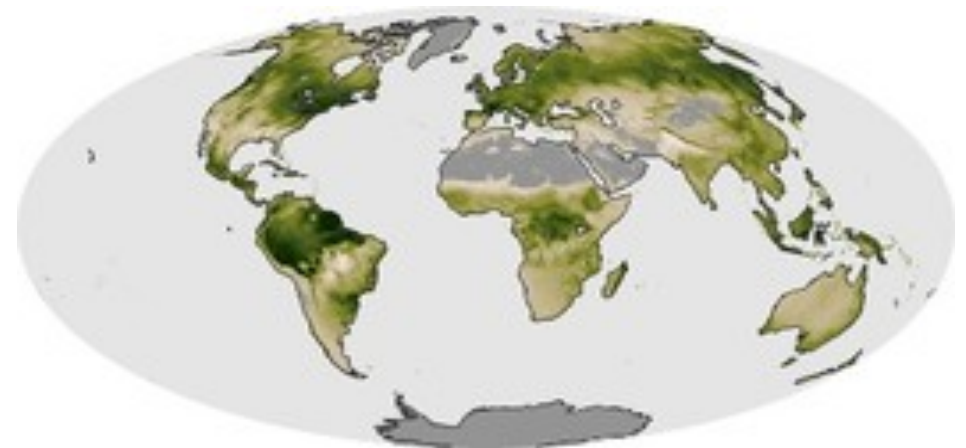
Download: http://visibleearth.nasa.gov/view_cat.php?categoryID=1484

NASA Earth Observatory

- NASA provides other streams of regularly updated and processed satellite data.
- [Global Maps](#) explore key parts of the Earth's climate system.
- Available for [free](#) (please credit NASA Earth Observatory as source).



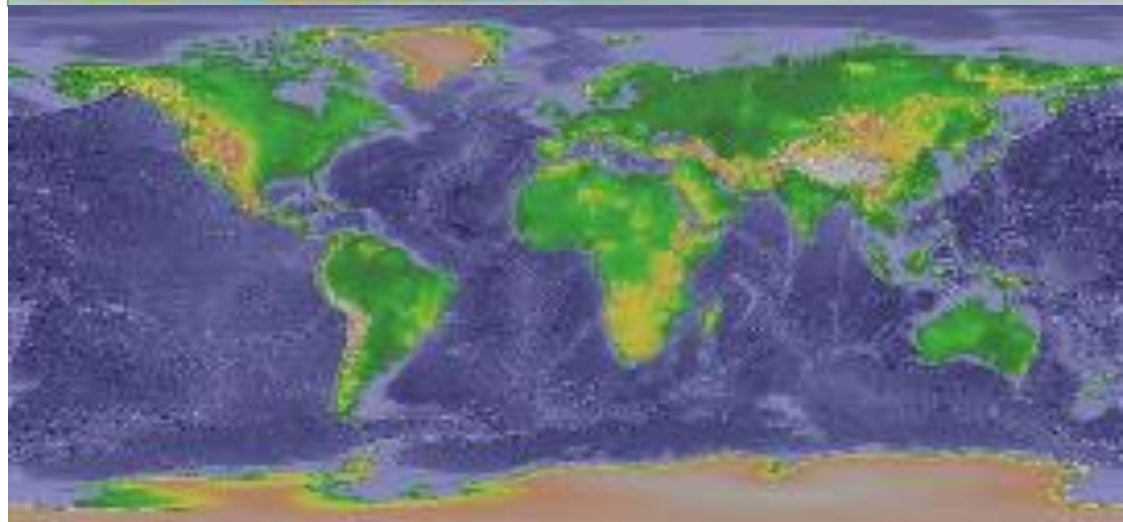
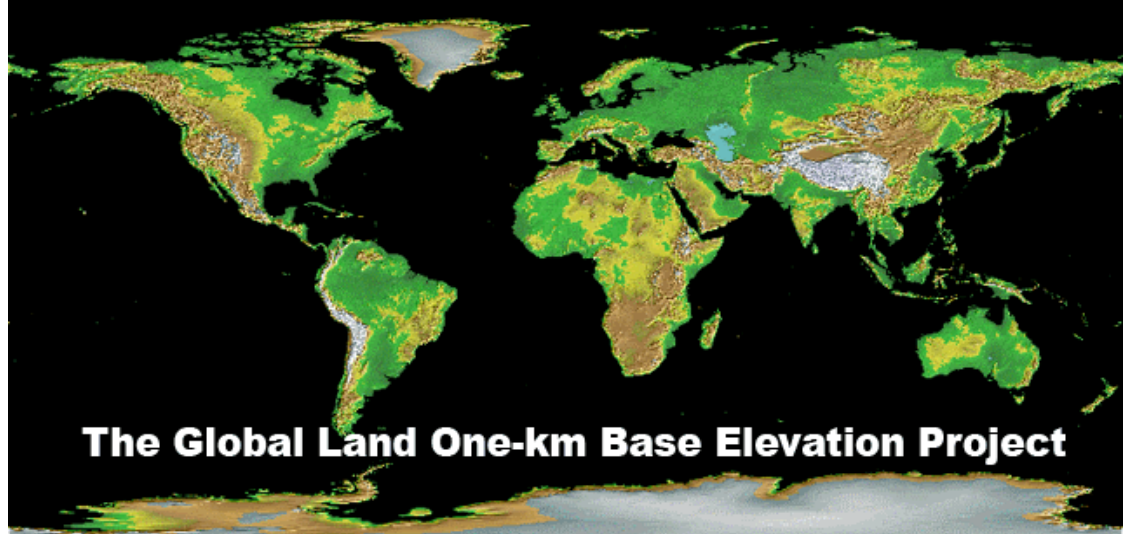
Vegetation (green plants)



Net Primary Production (photosynthesis)

NOAA Raster Data

- The National Oceanographic Atmospheric Administration (NOAA) provides useful high resolution raster data.
- Such as the global land elevation at 1 km resolution.
- And raster data with bathymetry data.
- <http://www.ngdc.noaa.gov/ngdc.html>



Open Street Map (OSM)



OpenStreetMap (OSM) Mapping

OpenStreetMap



The Free Wiki World Map

OpenStreetMap is a free editable map of the whole world. It is made by people like you.

OpenStreetMap allows you to view, edit and use geographical data in a collaborative way from anywhere on Earth.

OpenStreetMap's hosting is kindly supported by the [UCL VR Centre](#) and [bytemark](#). Other supporters of the project are listed in the [wiki](#).

Help Centre

[Documentation](#)

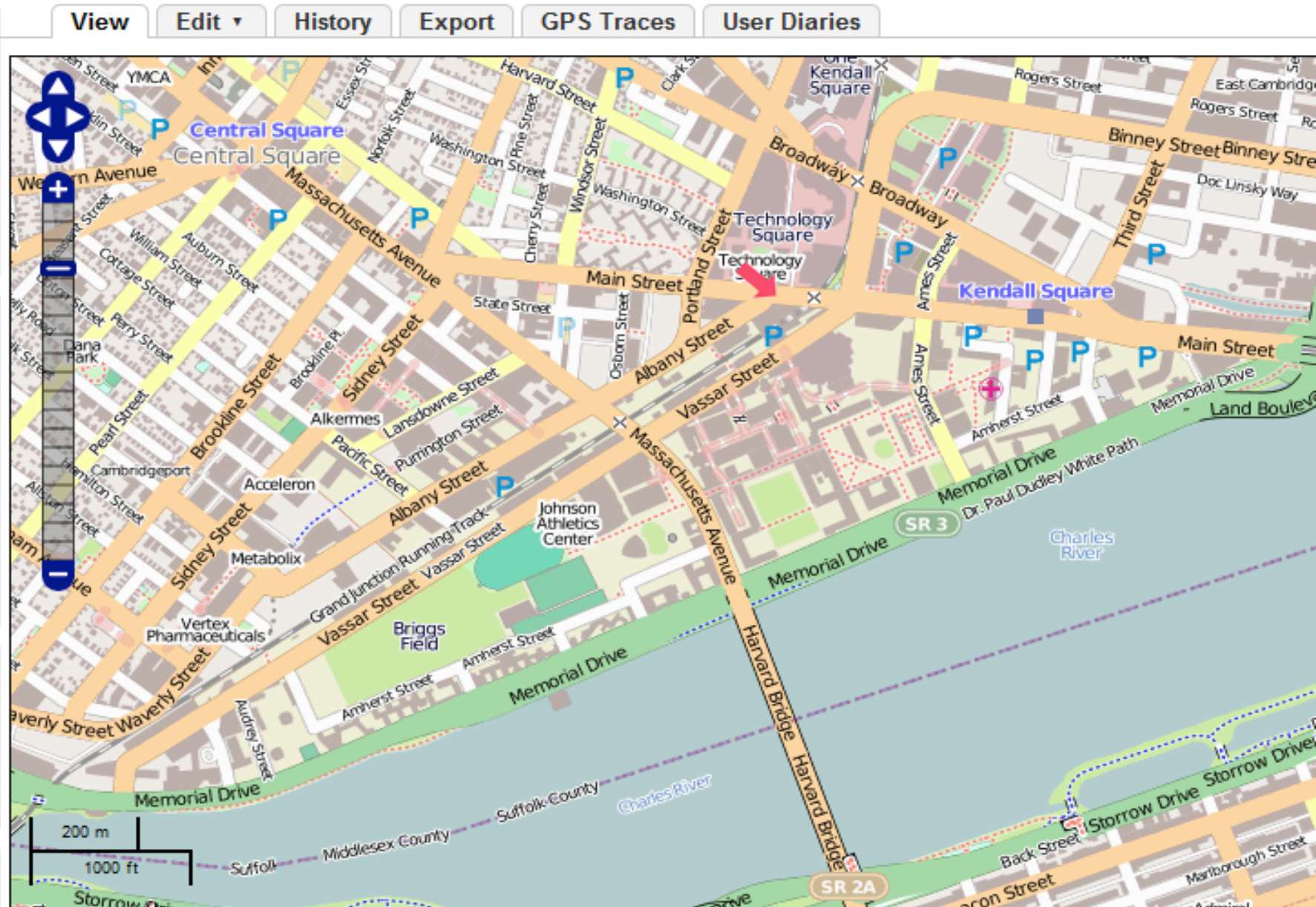
[Copyright & License](#)

[Community Blogs](#)

[Foundation](#)

[Map Key](#)

Come to State of the Map, September 9-11th, Denver



OpenStreetMap (OSM) Mapping

The image shows a screenshot of the OpenStreetMap (OSM) web interface. At the top, the title "OpenStreetMap (OSM) Mapping" is displayed in a large, black, sans-serif font. Below the title, the OSM logo is on the left, followed by a navigation bar with buttons for "Edit", "History", and "Export". To the right of these buttons are links for "GPS Traces", "User Diaries", "Copyright", "Help", and "About". Further right are "Log In" and "Sign Up" buttons. Below the navigation bar is a search bar with the text "Search" and "Where am I?", and a blue "Go" button. The main area of the image is a map of Tøyen, Oslo, Norway. The map shows a network of streets, including Sars' gate, Sofienberggata, Finnmarkgata, and Økernveien. Key landmarks like Botanisk hage and Tøyenparken are labeled. The map uses a color-coded system to represent different types of roads and features. A scale bar in the bottom left corner indicates 100 meters and 300 feet. In the bottom right corner, there is a copyright notice: "© OpenStreetMap contributors" and a link to "Make a Donation".

OpenStreetMap

Edit History Export

GPS Traces User Diaries Copyright Help About

Log In Sign Up

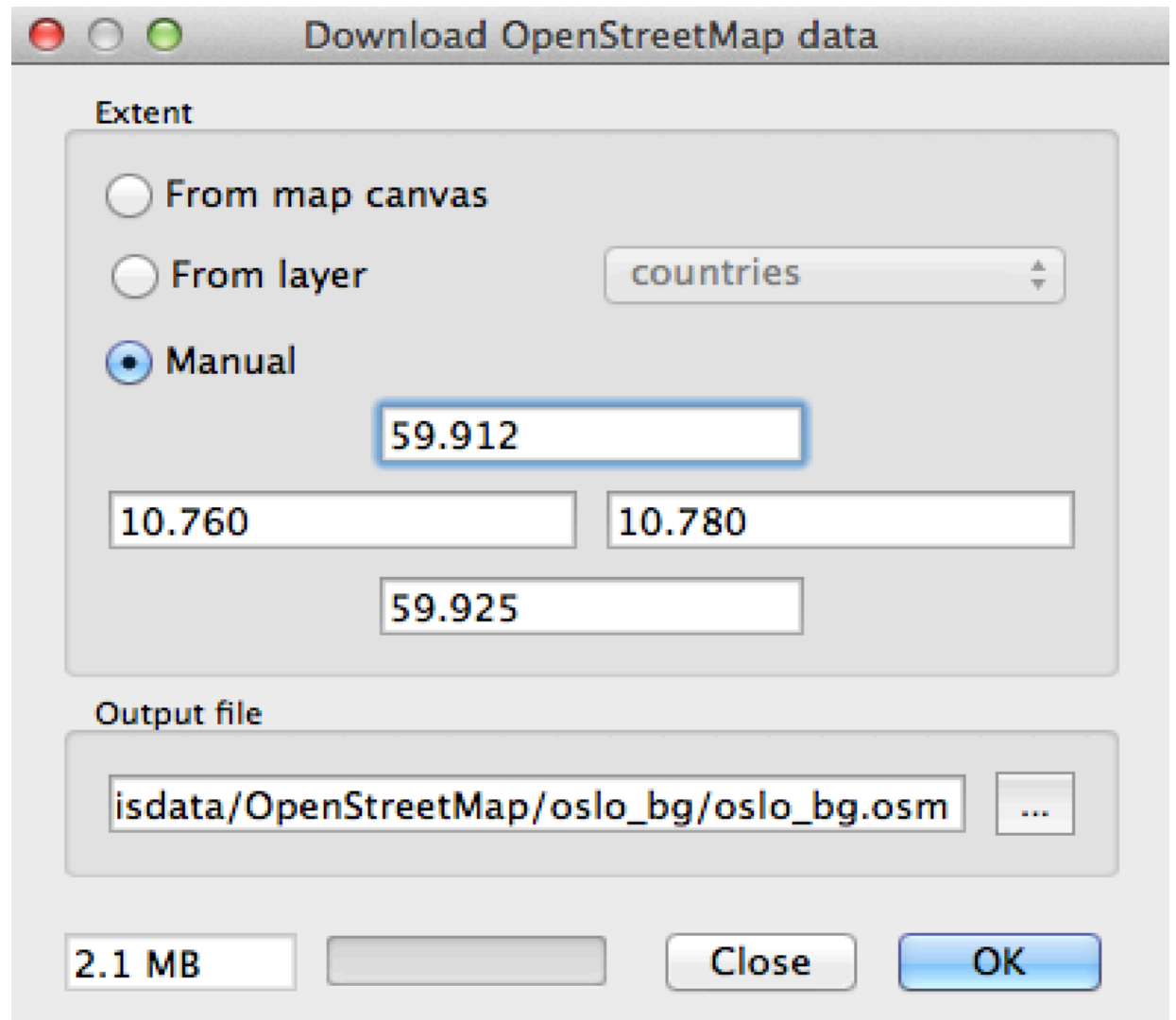
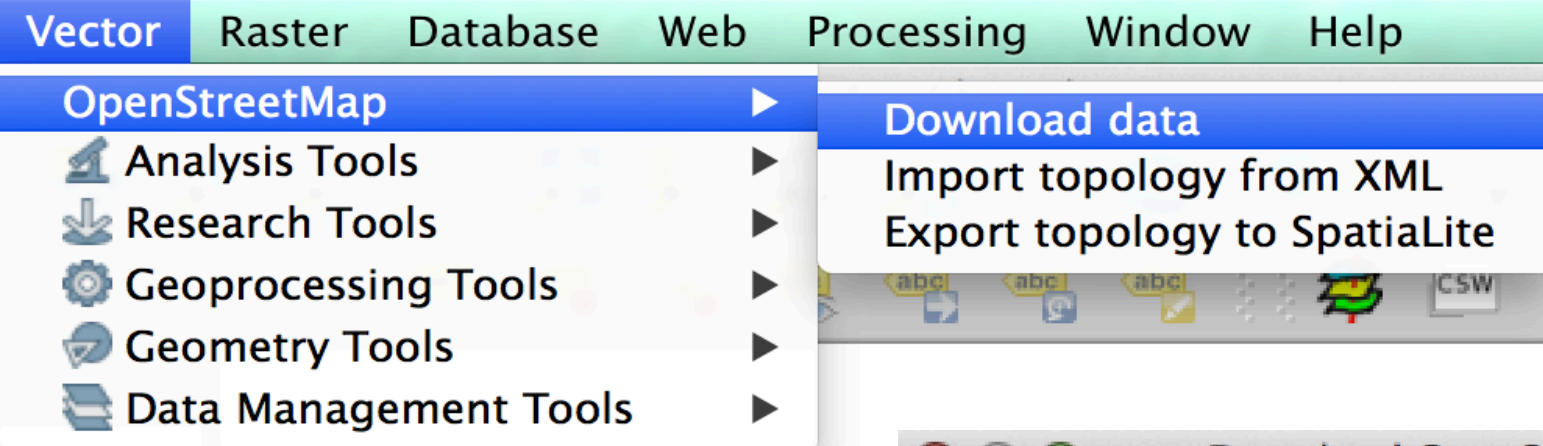
Search Where am I? Go

100 m 300 ft

© OpenStreetMap contributors Make a Donation

Open Street Map (OSM)

- The OSM project provides a free editable map of the world from GPS data, aerial photography or local knowledge.
- QGIS (now) integrates OSM import as a core functionality.
- Menu: *Vector*
 - *Vector* ▶ *Openstreetmap* ▶ *Load data*
 - *Vector* ▶ *Openstreetmap* ▶ *Import topology from an XML file*
 - *Vector* ▶ *Openstreetmap* ▶ *Export topology to SpatiaLite*
 - *Layer* ▶ *Add SpatiaLite Layer...*



- OpenStreetMap ▶
- Analysis Tools ▶
- Research Tools ▶
- Geoprocessing Tools ▶
- Geometry Tools ▶
- Data Management Tools ▶

- Download data
- Import topology from XML**
- Export topology to SpatiaLite

OpenStreetMap Import

Input XML file (.osm)

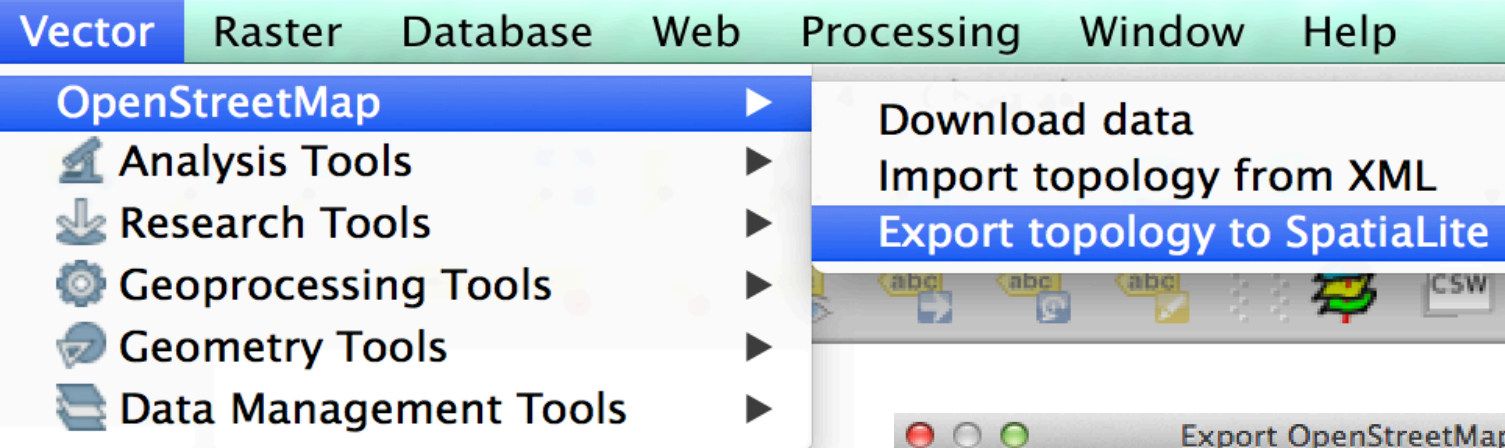
...

Output SpatiaLite DB file

...

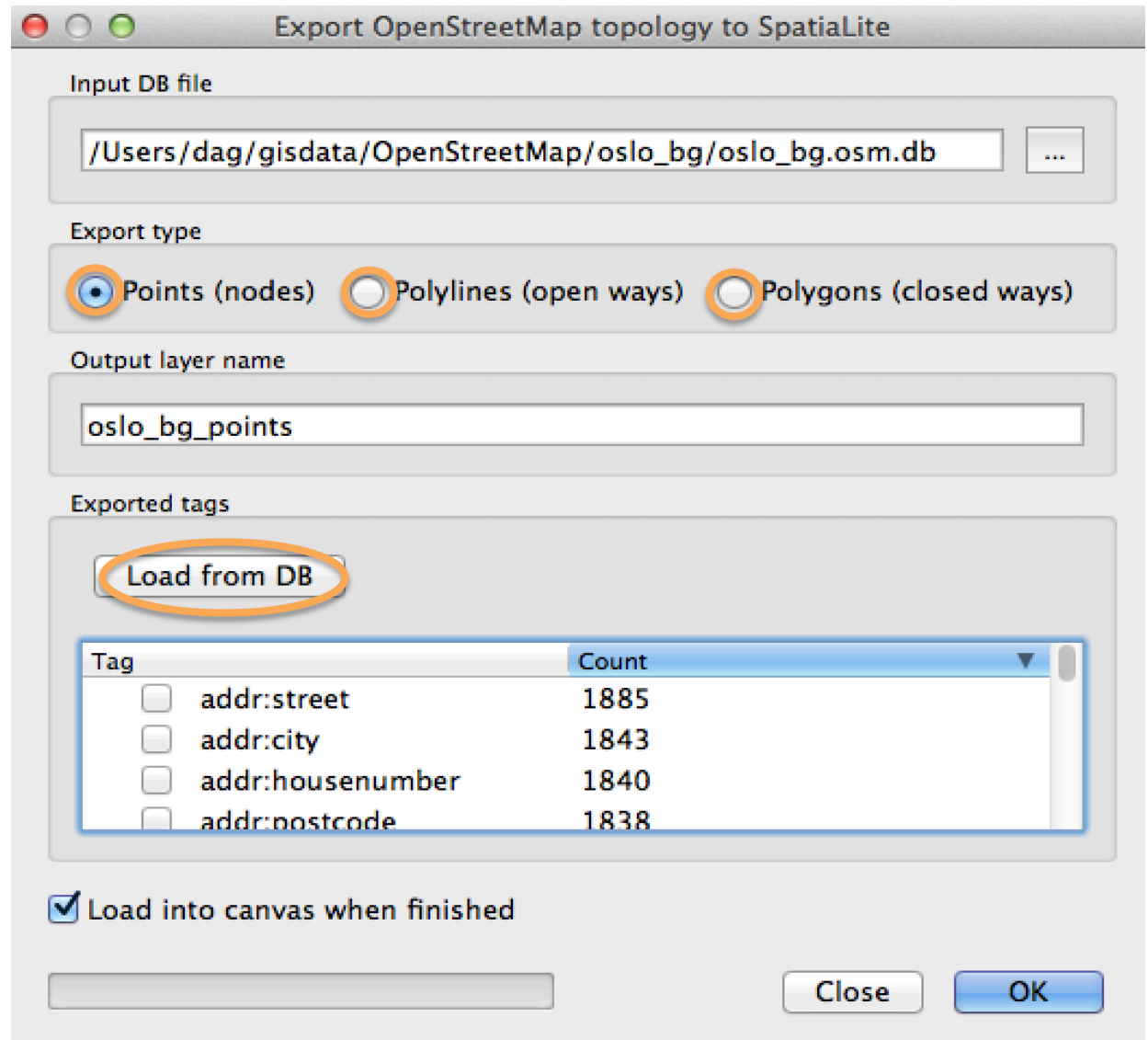
Create connection (SpatiaLite) after import

Connection name

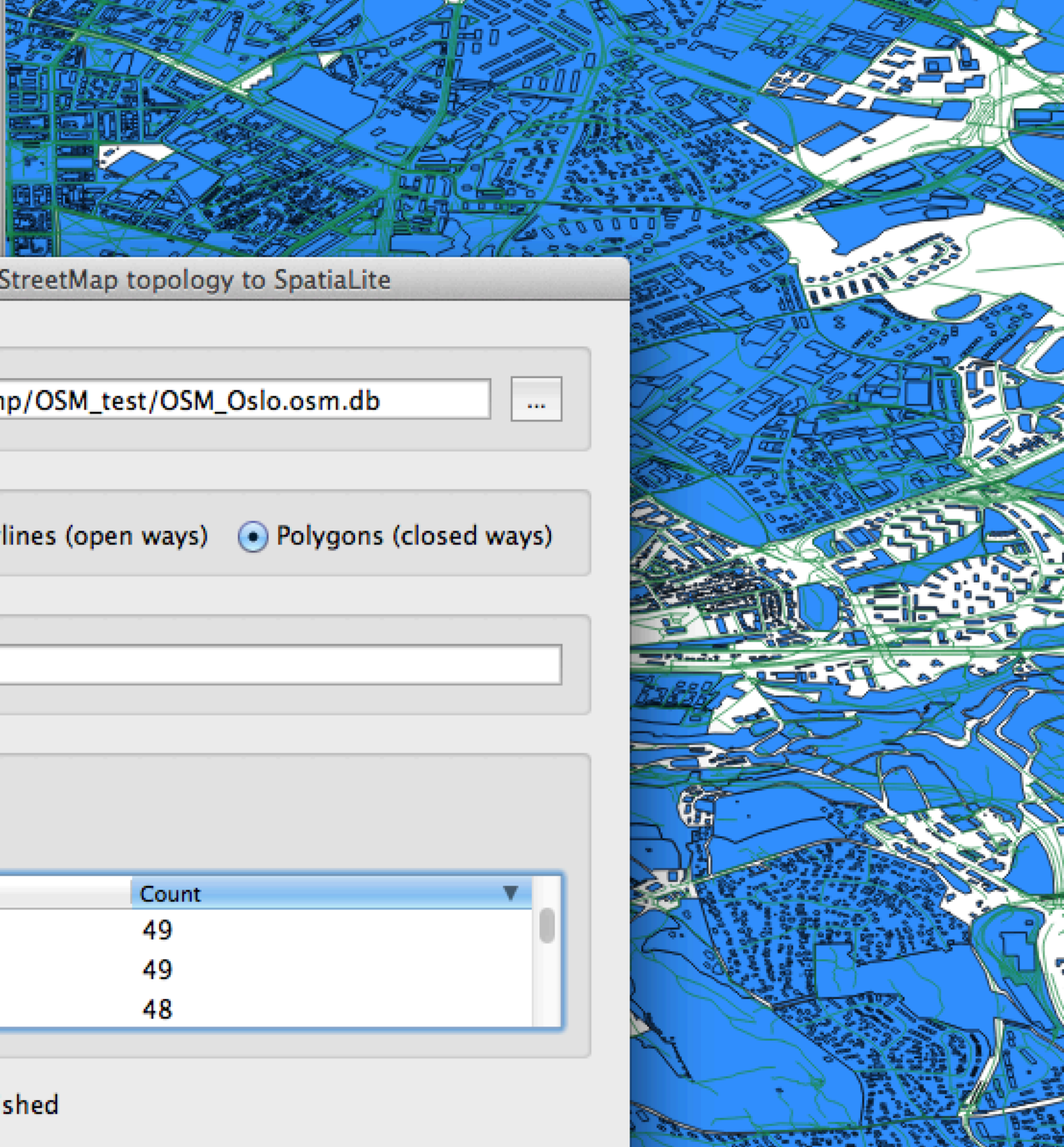


Repeat for each type (Points, Polylines, Polygons) and remember to press the “Load from DB” button for each type.

(You may select tags to load only some type of objects).



- vector_layers
- OSM_Oslo_polylines
- OSM_Oslo_polygons
- OSM_Oslo_points



Export OpenStreetMap topology to SpatialLite

Input DB file

...

Export type

Points (nodes) Polylines (open ways) Polygons (closed ways)

Output layer name

Exported tags


Tag	Count
<input type="checkbox"/> building:use	49
<input type="checkbox"/> history	49
<input type="checkbox"/> source:date	48


Load into canvas when finished

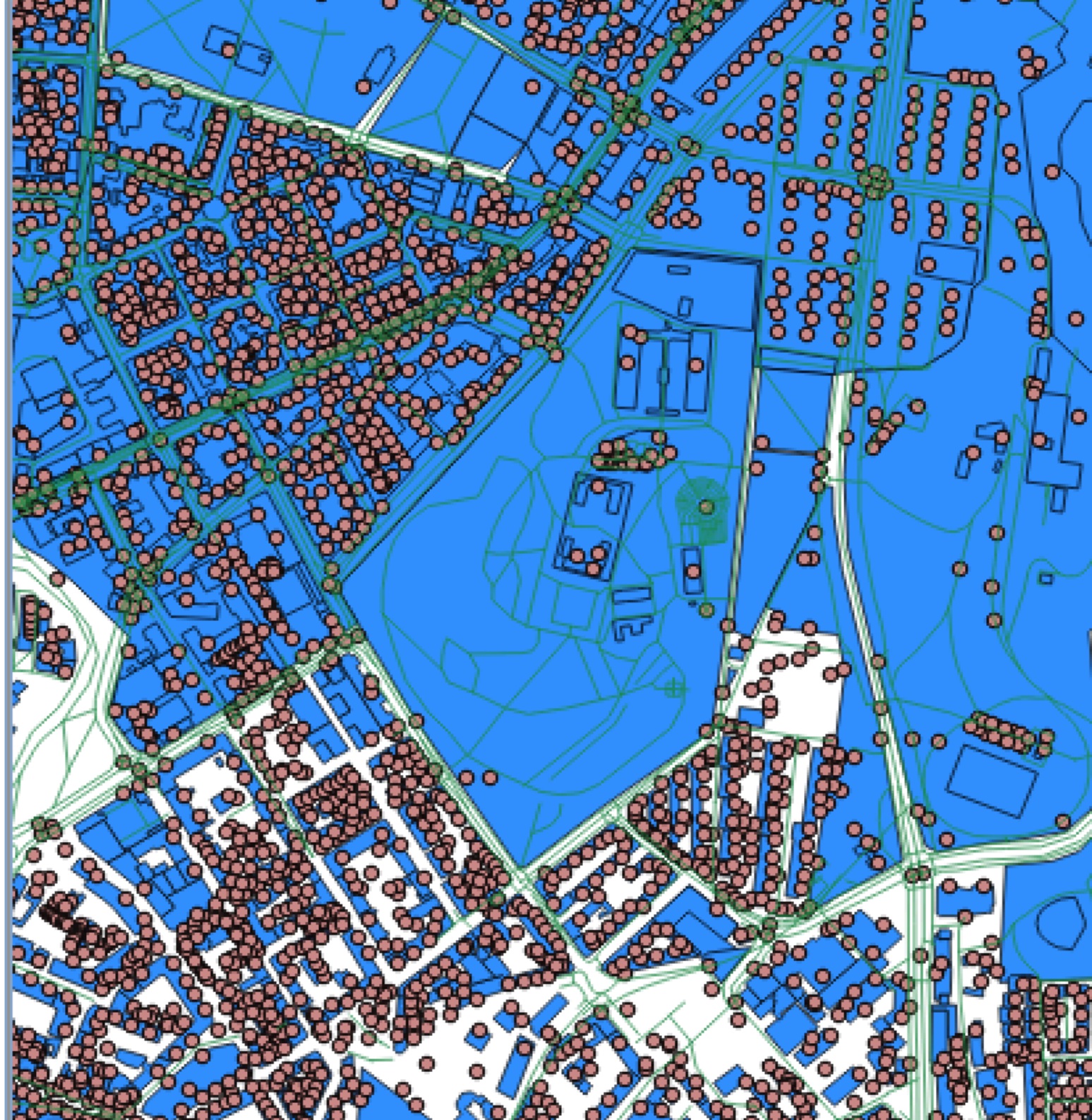
vector_layers

 OSM Oslo polylines

 OSM_Oslo_points

 OSM_Oslo_polygons

 countries



OGC web services

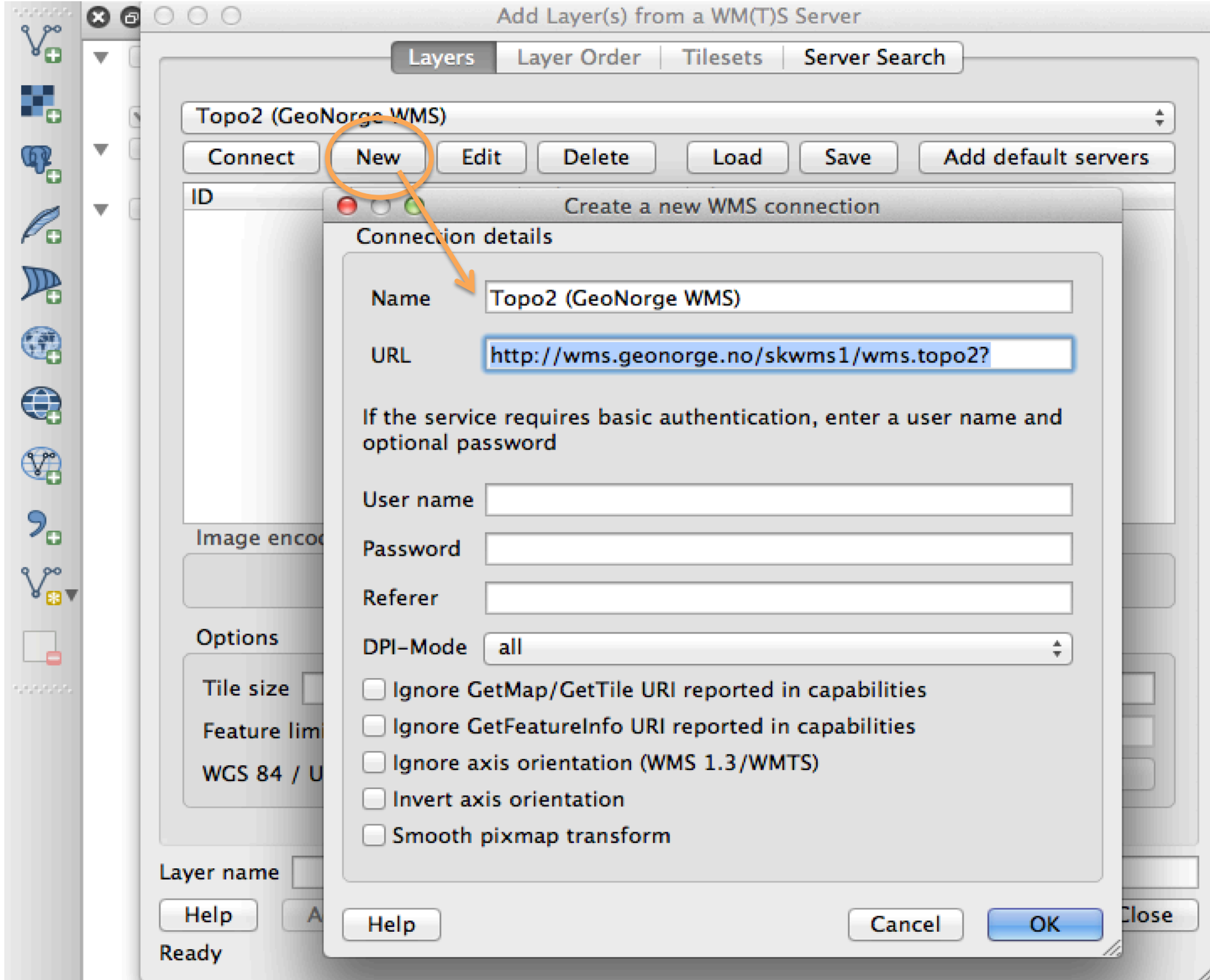


Kartverket

OGC web services

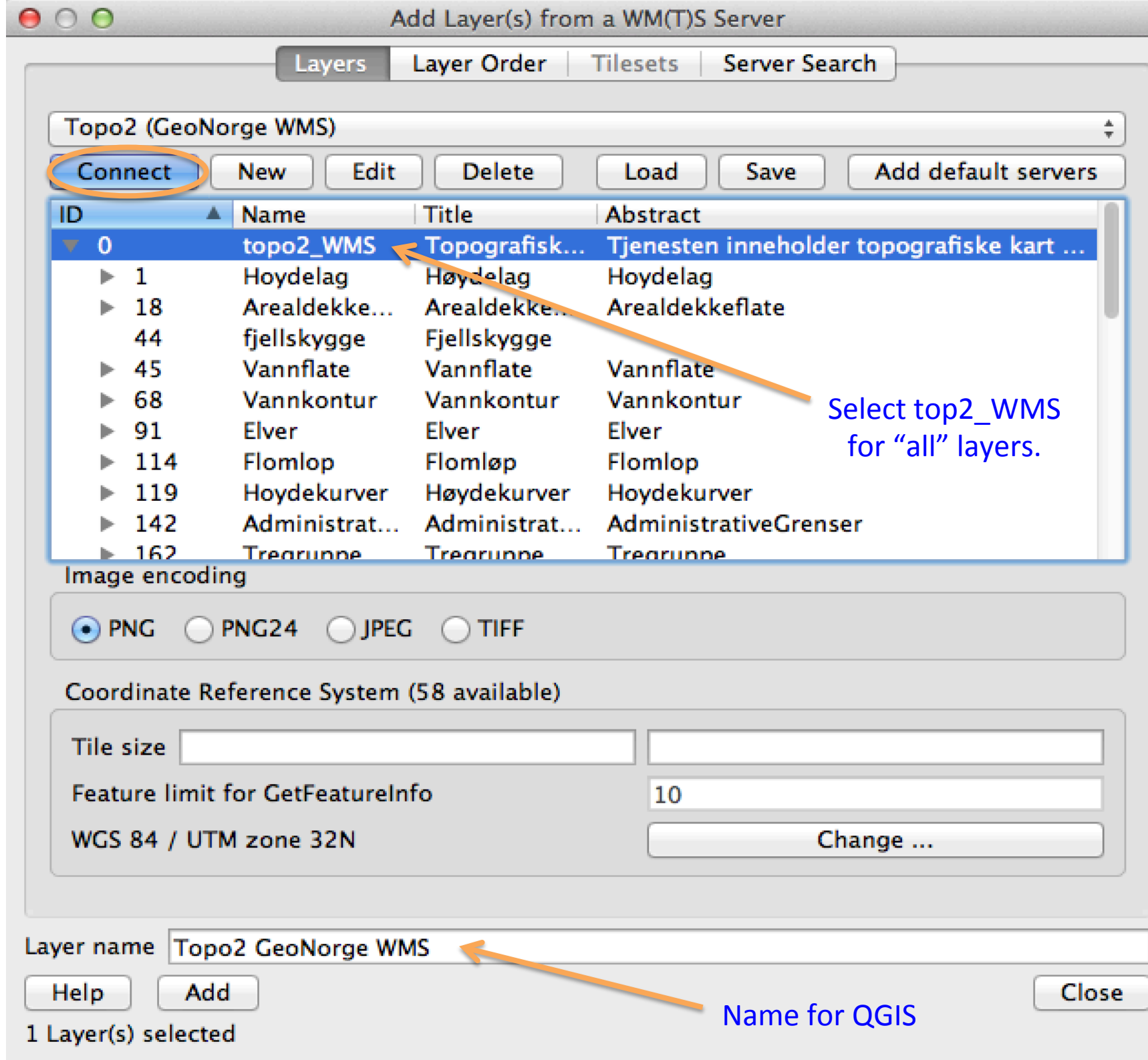
- The Open Geospatial Consortium ([OGC](#)) is an international organization maintaining standards for geospatial content and services, GIS data processing and exchange.
- Some of the relevant exchange standards:
 - **WMS** — Web Map Service
 - **WFS** — Web Feature Service
 - **WCS** — Web Coverage Service
 - **GML** — Geography Markup Language

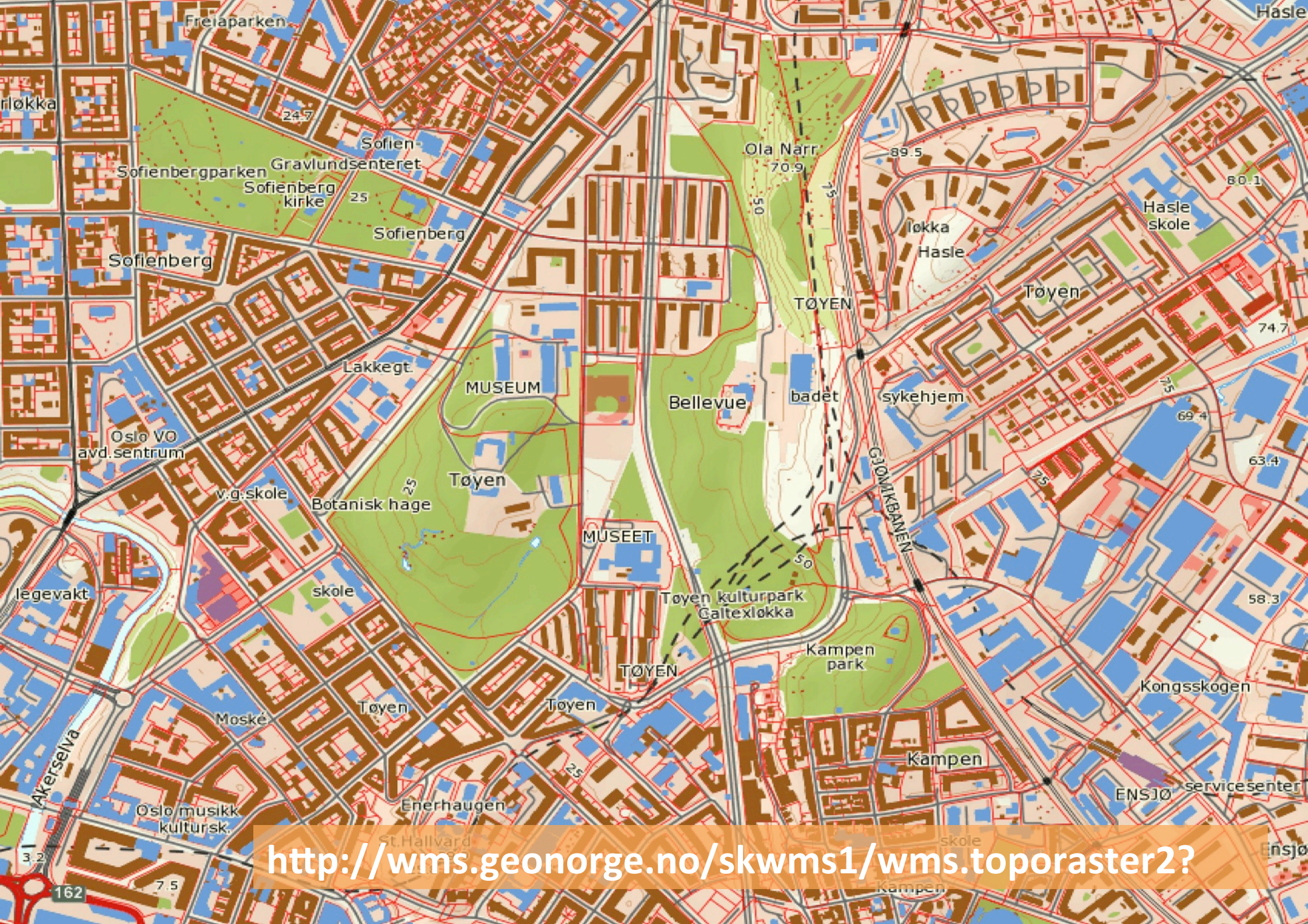
WMS – Web Map Service



Kartverket GeoNorge WMS – Topo2

<http://wms.geonorge.no/skwms1/wms.topo2?>





<http://wms.geonorge.no/skwms1/wms.toporaster2?>



<http://wms.geonorge.no/skwms1/wms.topo2.graatone?>

Artskart - WMS

The image shows a screenshot of a GIS application interface. The main window is titled "Add Layer(s) from a WM(T)S Server" and has tabs for "Layers", "Layer Order", "Tilesets", and "Server Search". The "Layers" tab is active, showing a list of layers from "Artskart, Artsdatabanken". The list includes a root layer "Artskart" and several sub-layers: "DD", "NT", "VU", "EN", "CR", and "RE". Each sub-layer has a "Title" and an "Abstract".

Below the list, there are options for "Image encoding" (PNG, PNG8, JPEG, GIF, TIFF, SVG) and "Coordinate Reference System (16 available)". The selected CRS is "WGS 84 / UTM zone 32N".

A "Create a new WMS connection" dialog is open in the foreground. It has a title bar "Create a new WMS connection" and a "Connection details" section. The "Name" field is "Artskart, Artsdatabanken" and the "URL" field is "http://kart.artsdatabanken.no/WMS/artskart.aspx?". There are fields for "User name", "Password", and "Referer". The "DPI-Mode" is set to "all". There are several checkboxes for advanced options: "Ignore GetMap/GetTile URI reported in capabilities", "Ignore GetFeatureInfo URI reported in capabilities", "Ignore axis orientation (WMS 1.3/WMTS)", "Invert axis orientation", and "Smooth pixmap transform".

At the bottom of the main window, there is a "Layer name" field with "Data fra Artskart" and buttons for "Help", "Add", and "Close". The status bar at the bottom left says "1 Layer(s) selected".

ID	Name	Title	Abstract
0	Artskart	Data fra Art...	Artsdatabanken p
▶ 1	DD	DD - Datam...	DD - Datamangel
▶ 9	NT	NT - Nær tr...	NT - Nær truet
▶ 17	VU	VU - Sårbar	VU - Sårbar
▶ 25	EN	EN - Sterkt ...	EN - Sterkt truet
▶ 33	CR	CR - Kritisk...	CR - Kritisk truet
▶ 41	RE	RE - Region...	RE - Regionalt ut



<http://wms.geonorge.no/skwms1/wms.topo2.graatone?>
<http://kart.artsdatabanken.no/WMS/artskart.aspx?>