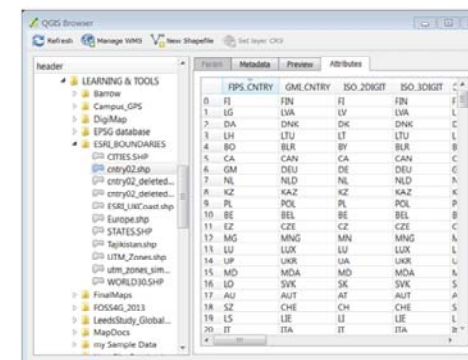


QGIS Browser



A 'GIS aware' Windows Explorer built into QGIS

- Review data properties and metadata
- Preview your datasets
- View attributes
- Add data to map window

! Access the Browser as a standalone application or a side-panel within the QGIS map window

The QGIS Browser allows you to navigate your file system, to browse for and add GIS data to your Project. You can preview your datasets as well as review properties and metadata.

You can access the browser in two ways:

1. As a standalone application
2. As a side-panel within your map window

1. The standalone application

The standalone Browser enables you to organise and manage your data, without having to start a QGIS map project. Navigating your file system follows the same logic as Windows Explorer, in terms of storage drives and expandable folders, however the Browser does not display file types that are incompatible with QGIS, thus aiding the process of searching for data. Highlighting a single dataset, you will be able to review that data in 3 or 4 different ways depending on the type of data. The Param tab gives details of connection-based datasets, e.g. MSSQL Spatial or PostGIS. The Metadata tab provides general information about the data. The Preview tab will provide a visual impression of the data, without having to import it into a QGIS map window (good for rapidly scanning multiple datasets). The Attributes tab presents the attribute values embedded in the data.

2. Side-panel Browser within your map window

The side panel Browser does not provide the previewing functionality of the standalone Browser. It is intended to allow easy navigation of your file system

from within a map project window. It will display GIS compatible data and allow you to intuitively drag-and-drop the data into your map. You can filter down by file type or file name by using the input text box at the top of the Browser panel.

Folder Structure

- Admin
- Analysis
- Code
- Database
- DataIn
- MapDocs
- QA
- Raster
- Reporting
- TIN
- Vector

- This example shows the folder structure adopted at GeoData for any new projects.
- It allows for organisation of different data types, reporting outputs and any code scripted by Developers

It is important when beginning any new GIS project to organise your data. You will come to learn that when using a GIS many outputs are generated, which may result in confusion if a proper Data Management procedure is not followed.

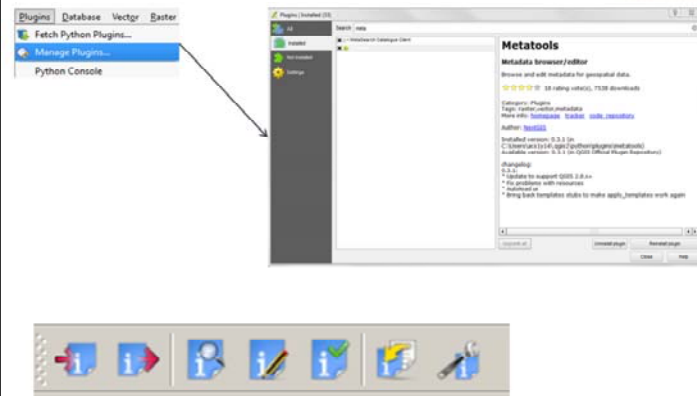
Critical Role of Metadata

- Information about data and how they were collected
- Limitations of data
 - Currency
 - Accuracy
 - Completeness
 - Error
- Provenance
 - Audit trail of collection, reformatting & analysis processes
- Basis for sound decision making

Metadata is crucial as it allows one to know where a dataset comes from, how it was created and when. If it is good metadata, there will also be an audit trail of processing that might have been performed to the data



Metadata in QGIS cont

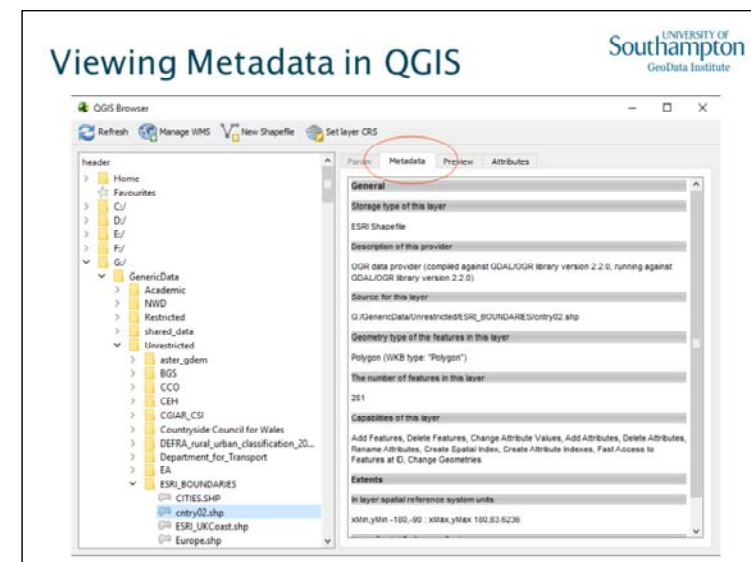
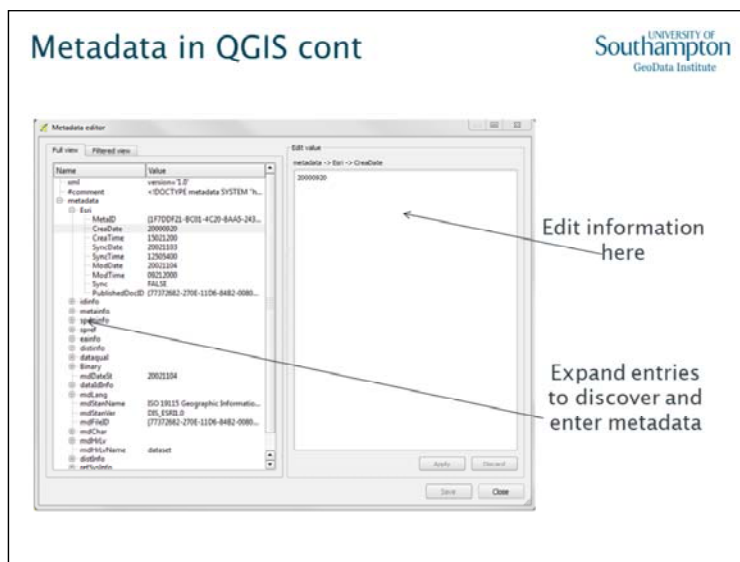


The metatools plugin provides the ability to read and write metadata to XML files associated with file based datasets. In QGIS 2.2 – 2.4 an incompatibility between the plugin and QGIS means that an error will occur if a plugin command is run before the Python Console window is opened in the active QGIS session.

One of the strengths of metatools is that the metadata that it creates can be read by other GIS software such as ArcGIS.

Other plugins that allow metadata to be recorded include Qsphere which facilitates the generation of EU INSPIRE compliant metadata.





The Browser metadata tab shows data source and format information that is reported by QGIS, it does not display user entered metadata.

Metadata in QGIS cont

The more detailed the Metadata is, the more useful it is to someone else using your data.

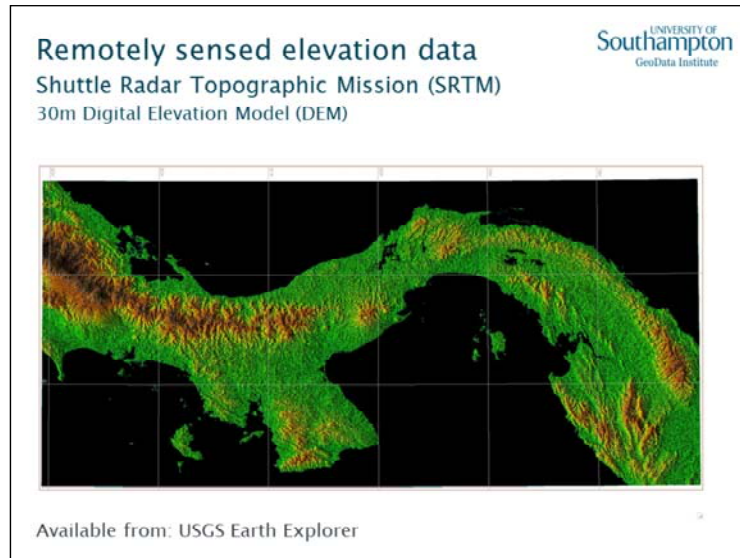


This is user entered metadata, displayed using the metatools plugin. This can show metadata that has been entered using the plugin, and also ArcGIS metadata files.

Data Sources

- What is available?
 - Global, contextual data
 - Population, health, development
 - Cloud-based data

The following slides present a snapshot of some very useful current websites. Initially we will look at UK-focused data sources before going on to international and global data.



Remotely sensed raster data include terrain models of land elevation, vegetation index data, land cover classifications and aerial imagery.

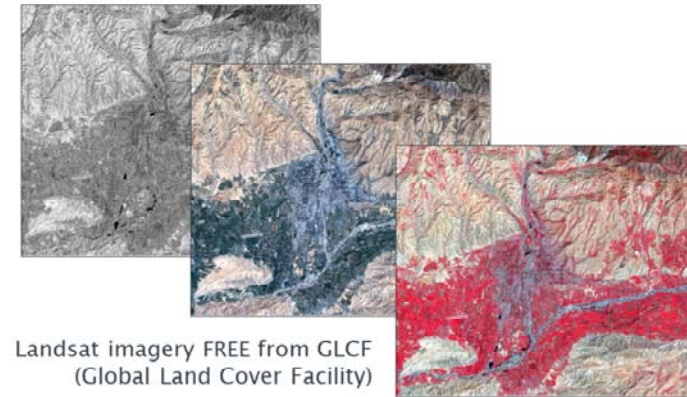
Digital Elevation Model (DEM) data representing the heights of the entire Earth's land surface can be acquired at a 30m resolution.

Satellite imagery also provides data such as land/vegetation cover.

Pictured: SRTM Global 30m elevation dataset, available from <http://earthexplorer.usgs.gov/>

Remote Sensing

Landsat Imagery (& derived products)



Landsat imagery FREE from GLCF
(Global Land Cover Facility)

Landsat – band 4 (the blue band) can be used for marine interpretation – currently available at 30m resolution

The most recent satellite, Landsat 8, includes a sensor with a new deep blue band for coastal/aerosol studies

A wealth of imagery, land cover and other derived products, available from:

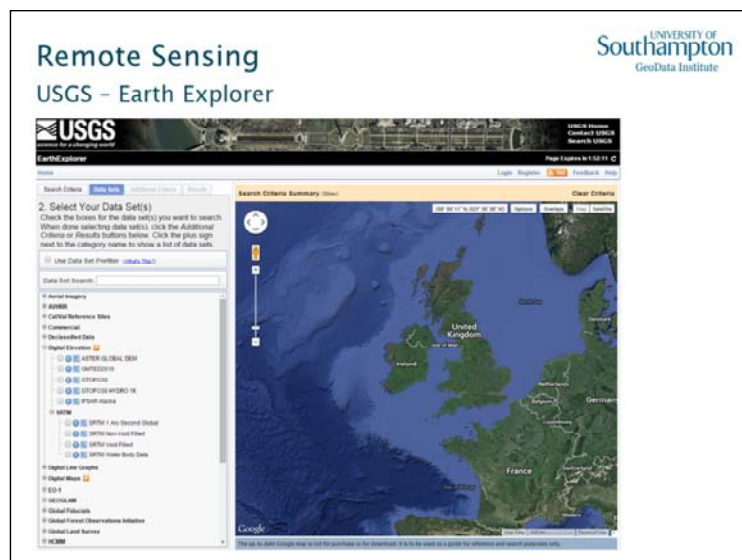
Global LandCover Facility: <http://glcf.umd.edu/data/> Also provides a range of satellite imagery, DEMs, remote sensed derived products

LandsatLook – WebGIS tool for rapid online viewing:
<http://landsatlook.usgs.gov/>

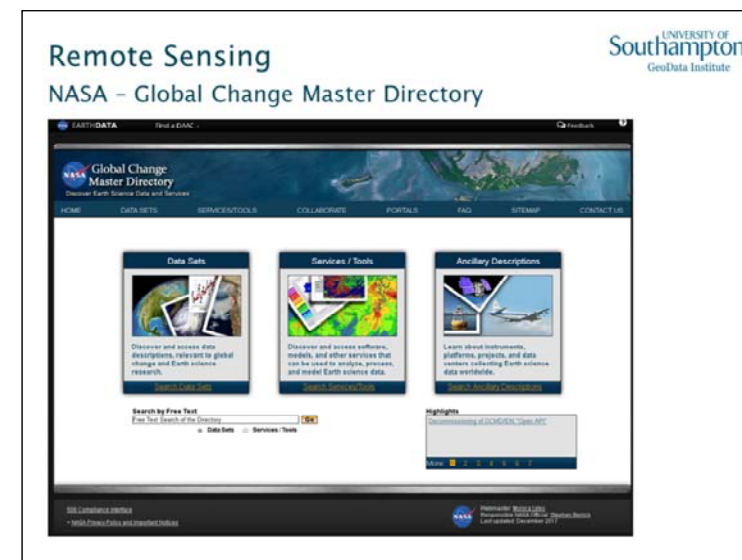
Glovis - Data viewing/download: <http://glovis.usgs.gov/>

Landsat 8 information: <http://landsat.usgs.gov/landsat8.php>

□ *GeoData Institute in
association with
ABPmer*



Earth Explorer is an excellent data repository for a very wide range of data, primarily earth sciences, E.g. DEM, land cover, satellite images, radar, vegetation monitoring (indices).



The USA provides a wealth of free datasets because of their freedom of information acts. Data quality is not necessarily assured however.

<http://gcmd.nasa.gov/KeywordSearch/Home.do?Portal=GCMD&MetadataType=0>

http://geoengine.nga.mil/geospatial/SW_TOOLS/NIMAMUSE/webinter/rast_roam.html

<http://www.ngdc.noaa.gov/mgg/fliers/01mgg04.html>

<http://www.usgs.gov/>

<http://www2.jpl.nasa.gov/srtm/>

<http://freegisdata.rtwilson.com/>

Free GIS Data
Home
Physical
Human
Country specific
FAQ
[1 Like](#)
[1 Tweet](#)
[1 Update](#)

This page contains a categorised list of links to over 300 sites providing freely available geographic datasets - all ready for loading into a Geographic Information System.

Use how links to everything from arctic penumbra maps to gridded population data - simply scroll through the list, or use the dropdown menus above to jump to a specific section of interest. See the FAQ for more information on the what, who, how and why of the list.

Warning: The data listed below may be inaccurate, incomplete, or just plain wrong. Always, critically examine the data you are using. Note all what organisations provided it and what agendas they may have, and beware that there are disparities over some of the data (particularly county boundaries).

This list was last updated on 11 October 2014.

Physical Geography

General

- Natural Earth - Vector:** Includes coastline, land, oceans, islands, rivers, lakes, glaciated areas and bathymetry. Available at multiple levels of detail. A version of this data is also available in the Wagoner 'V' projection, which has good equal area properties. [More](#)
- Natural Earth - Raster:** Includes various raster images, intended for use as backgrounds for other data, for example hypsometric tints, satellite derived land cover, shaded relief etc.
- Global Map:** A set of consistent GIS layers covering the whole globe at 1km resolution including transportation, elevation, drainage, vegetation, administrative boundaries, land cover, land use and population centres. Produced by the International Working Committee on Global Mapping. [Download the data](#)
- OpenStreetMap (OSM):** A collection of data collected from a number of the sources below - includes administrative areas, inland water, roads and railways, elevation, land cover, population and climate. Probably the easiest place to get a simple set of data for a specific country.
- UNEP GEOCLASS:** A wide range of data from the United Nations Environment Programme including Global Forest Cover, Global Potential, Population, Global Average Monthly Temperature, Climate, Vegetation Boundaries and much more. To get data, choose Advanced Search and select Geospatial Data Sets from the top drop-down box.
- Worldometers:** GIS data aggregation site including data in a number of categories such as elevation, environment, climate etc. Some global datasets, some based on countries, some for specific countries. Mostly useful, but some rather [questionable](#).
- MapCrunch:** GIS aggregation site including wide range of data for various areas of the world. Some datasets appear to be of low quality, but others are good.
- GeoNetwork:** GIS aggregation site including a wide range of data under various categories (both human and physical).
- European Environment Agency:** Maps and datasets from the European Environment Agency, covering a huge range of physical geography and environmental topics. Europe only.

Land and Ocean Boundaries

- GEBCO:** A Global Bathymetric, Hierarchical, High-resolution Shoreline Database - which basically means it's good quality (no internal inconsistencies, good accuracy).

• One-stop-shop for GIS data!

• Topics cover Human & physical Geography

Excellent website maintained by a Geography lecturer at Southampton University. Includes over 25 categories of data covering both physical and human Geography.

Note, this is a voluntary effort and therefore the website is not responsible for the quality or accuracy of data individual sources. Standard data QA procedures should be followed & any errors reported to the site.

Data Sources


- What is available?
 - Global, contextual data
 - Population, health, development
 - Cloud-based data

The following slides present a snapshot of some very useful websites for mapping and analysis in the International/development sector.

WorldPop! UNIVERSITY OF Southampton
GeoData Institute

world pop [ABOUT OUR WORK](#) [NEWS](#) [DATA](#) [CONTACT](#)

**Population dynamics:
Mapping changing population densities
over days, weeks, months**



What is WorldPop?

High spatial resolution, contemporary data on human population distributions are a prerequisite for the accurate measurement of the impacts of population growth, for monitoring changes and for planning interventions. The WorldPop project aims to meet these needs through the provision of detailed and open access population distribution datasets built using transparent approaches.

The WorldPop project was initiated in October 2013 to combine the 100Pop, AsiaPop and AfricaPop population mapping projects. It aims to provide an open access archive of spatially explicit, up-to-date, and high resolution data to support development, disaster response and health researchers. The methods used are described.

www.worldpop.org.uk/

www.worldpop.org.uk/



WorldPop! UNIVERSITY OF Southampton
GeoData Institute

How would you like to access our data?


[Home to view our data](#)

Quick Search
Search all currently available WorldPop data

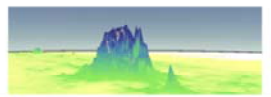
Data List
This page provides a list of the WorldPop data products that are currently available, regularly updated as new products are constructed.

Product	Region	Year	Resolution
100Pop	Global	2010	100m
AsiaPop	Asia	2010	100m
AfricaPop	Africa	2010	100m

Map Selector
Use our interactive map to select the data you want to download. Select the data type.



Data Portal (Beta)
The Data Portal is an experimental application allowing users to view and manipulate the data. It is a complement to the data generated by the project and is available from the project.



[YouTube tutorial](#)



Humanitarian Data Exchange

UNIVERSITY OF Southampton
GeoData Institute

The screenshot shows the HDX website interface. At the top, there's a navigation bar with links like DATA, LOCATIONS, ORGANISATIONS, GUIDELINES, and FAQ. Below this, a search bar and a 'Find Data' button are visible. The main content area displays the profile for the 'United Republic of Tanzania'. It includes 'Key Figures' such as Population (55.6m), Land area (885.8k), Population density (62.7), and GDP per capita (2.8k). There's also a 'Data (188)' section with filters for 'POLICY BY' (Organisation, Location, Topic) and 'ORDER BY' (Relevance). A small inset image shows a map of Tanzania.

<https://data.humdata.org/>



Open Street map - bbike

UNIVERSITY OF Southampton
GeoData Institute

Open Street Map - themed extracts, e.g. buildings, roads etc. within user-defined extents

The screenshot shows the 'Open Street Map - bbike' website. It features a map of East Africa with a highlighted area in the Democratic Republic of Congo. The interface includes a search bar, a 'Your email address' field, and a 'Name of area to extract' field. Below these, there's an 'extract' button and instructions: 'Move the map to your desired location. Then click [button] to create the bounding box.' The map shows various geographical features like roads, buildings, and water bodies.

<https://extract.bbbike.org/>



Open Street map - bbike

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Global Administrative Areas

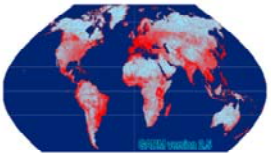
Boundaries without limits

Download Known problems About Contact

GADM database of Global Administrative Areas

GADM is a spatial database of the location of the world's administrative areas (or administrative boundaries) for use in GIS and similar software. Administrative areas in this database are countries and lower level subdivisions such as provinces, departments, lbbag, bundeslaender, daerah istimewa, fivondronana, kvong, landroevaa, optima, rous-prefectures, counties, and thana. GADM describes where these administrative areas are (the "spatial features"), and for each area it provides some attributes, such as the name and variant names.

The current version is 2.8 (November 2015). Version 3 is expected to be available in August 2017.



The current version of GADM delimits 294,430 administrative areas.

- Shapefile boundary data
- Other formats available
- vector polygons

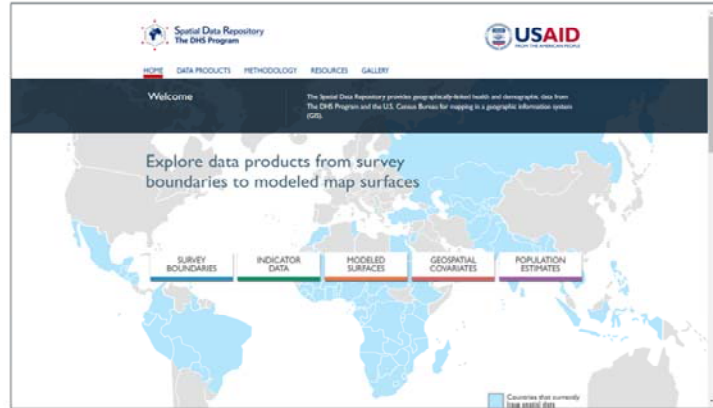
www.gadm.org



DHS – Spatial Data Repository

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Wide range of spatial data



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GeoData Institute

USAID

HOME DATA PRODUCTS METHODOLOGY RESOURCES GALLERY

Welcome

The Spatial Data Repository provides geographically-linked health and demographic data from The DHS Program and the U.S. Census Bureau for mapping in a geographic information system (GIS).

Explore data products from survey boundaries to modeled map surfaces

SURVEY BOUNDARIES INDICATOR DATA MODELED SURFACES GEOSPATIAL COVARIATES POPULATION ESTIMATES

Countries that currently use DHS ID1

<https://spatialdata.dhsprogram.com/home/>



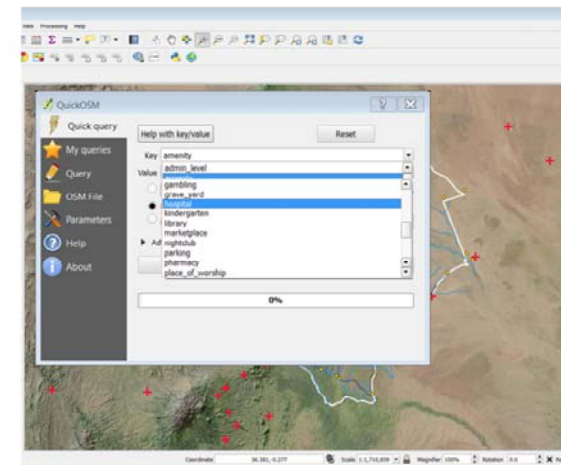
Data Sources

- What is available?
 - Global, contextual data
 - Population, health, development
 - **Cloud-based data**

The following slides present a snapshot of some very useful websites for mapping and analysis in the International/development sector.



Open Street map – Quick OSM



Quick OSM – QGIS plugin providing a simple interface to query the OSM database and download specific features of interest



Open Layers Plugin

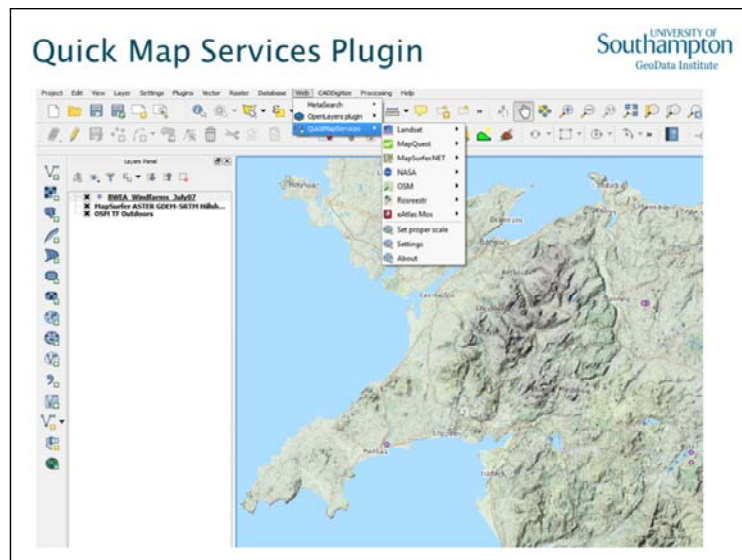
The Open Layers Plugin allows you to add background imagery to your project from Google Maps, Open Street Map, and Bing Maps

The screenshot shows the QGIS interface with the 'Plugins' menu open, displaying 'Manage and Install Plugins...'. The 'OpenLayers Plugin' is listed under 'Installed' in the 'Plugin Manager' dialog. The 'Processing' menu is also open, showing the 'OpenLayers plugin' under the 'Raster' category. The 'OpenLayers Overview' dialog is visible, showing the plugin's details and a 'Download' button.

Open Layers Plugin

The screenshot shows the QGIS interface with a map of a coastal area. The 'OpenLayers Plugin' is visible in the 'Processing' menu. The map is labeled 'Open Layer - Google Hybrid 2018'.





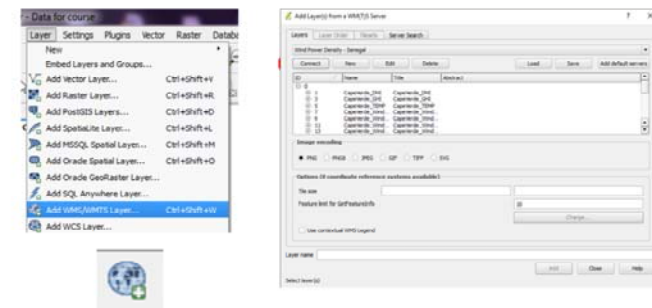
On a similar theme, Open Map Services provides a range of very useful and interesting geographic surface models, such as hillshading, contours etc.

Unlike OpenLayers, Quick map services data can be projected into different coordinate reference systems. The image above is viewed in British National Grid.



Web Services

- Web Services offer web based data sources or geoprocessing capabilities
- QGIS allows you to create connections to WMS and WFS servers so that you can load GIS data stored on the Web

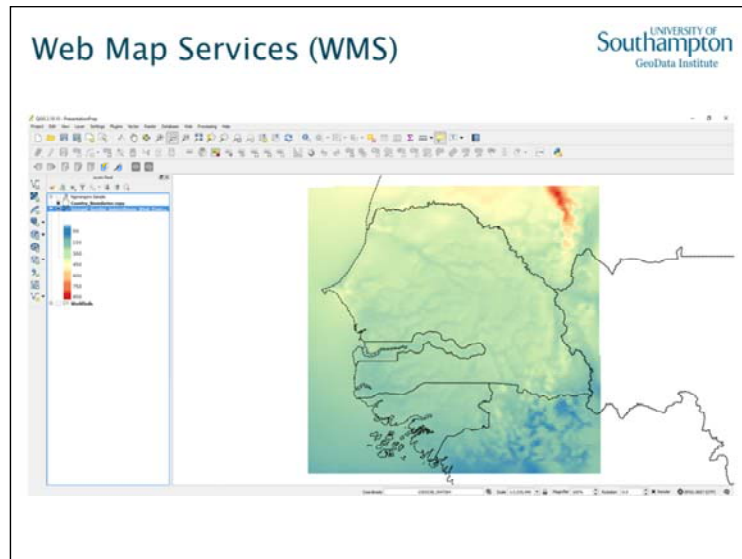


WMS – Web Mapping Service – Raster images

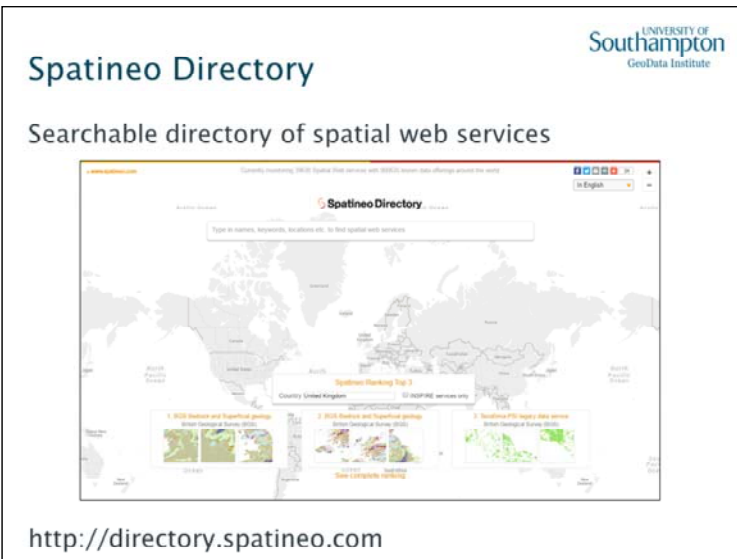
WFS – Web Feature Service (available as a plugin) - Vector data

WPS – Web Processing Service (available as a plugin) – Geoprocessing





By default, no WMS servers are loaded in QGIS, however you are able to add some default servers which might provide you with some useful data as well as create new connections. The above WMS shows windpower density



Data Pre-processing

Working with Table Data

There are 2 types of table which can be viewed in QGIS

- **Spatial data tables:** Shapefile, MapInfo tab or Spatialite, etc
- **Non-spatial tables:** CSV,DBF,TXT, etc.

•Spatial vector data is data which is associated with a geometry in your QGIS project, such as a shapefile or spatialite layer

•Non-spatial data is data which is not currently associated with a geometry in your QGIS project. The common non-spatial file types which QGIS currently supports are .csv, .dbf and txt files.

IMPORTANT NOTE - You cannot import txt files if they have no x and y column.



Data Pre-processing

Working with Table Data

Table Joins: A join is performed when you have 2 tables with information about the same objects and the tables have at least 1 common field.

1. Spatial boundary data (with attribute table)

2. Non-spatial table data

Source: <https://spatialdata.dhsprogram.com/home/>

Attribute Join

E.G. If you have a table showing the Name, Developer, Operator and Owner of various wind farms, and a second table showing the Name, Latitude and Longitude of wind farms, you can perform an attribute join based on the Name field so that your output contains the Name, Developer, Operator, Owner, Latitude and Longitude in one single table.

Spatial Join

If you have a point layer showing wind farm locations and a polygon layer showing national park extents, you can create a join to see which wind farms fall within a National Park.



Data Pre-processing Working with Table Data

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Regional HIV prevalence

Result... spatial data

NOTE: You must have a field common to both tables, though the exact format and name of the fields do not have to be the same.

Data Pre-processing Working with Table Data

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Plotting XY locations from non-spatial tables, example: you have a txt or csv file with point location coordinates....

QGIS will now plot the points

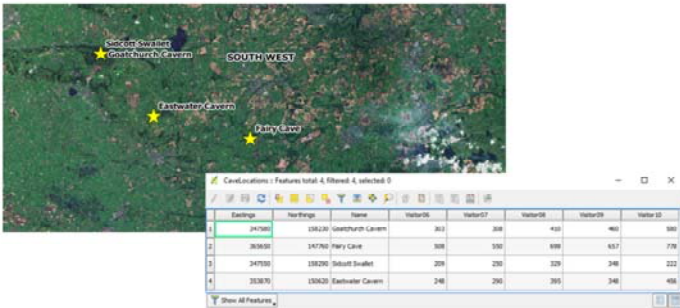
The **Add Delimited Text Layer** plugin in QGIS allows you to create tables from external data sources such as .txt and .csv files.

This allows you to add .txt files, .csv files, and .wkt files. If the data contains point coordinates you will need to specify the x and y fields.

Data Pre-processing

Working with Table Data

Once locations are plotted within QGIS, export them to Shapefile, for example, to create new spatial data



Eastings	Northings	Name	VectorID	VectorID	VectorID	VectorID	VectorID
247500	136120	Cockburns Cavern	302	308	420	460	580
263000	147700	Penny Lane	309	310	609	617	719
247500	136200	Sedgwick Swallow	201	220	329	340	222
253000	136200	Eastwater Cavern	240	260	360	340	460


The **Add Delimited Text Layer** plugin in QGIS allows you to create tables from external data sources such as .txt and .csv files.

The plugin comes as part of the standard install of QGIS, but it may need enabling through the QGIS plugin manager.

This allows you to add .txt files, .csv files, and .wkt files as long as they have X and Y fields or Lat/Long fields.

Data Conversion

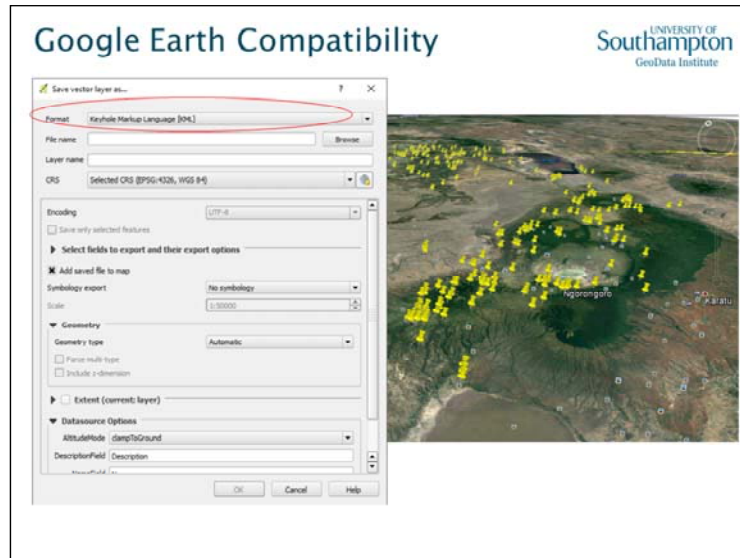
- QGIS natively supports a very wide range of vector file formats; primary formats include shapefiles and SQLite databases



- There is also a Raster translator which allows you to convert between a wide range of raster formats

To convert from one format to another, open the dataset and then use the *Layer > Save As...* command to save to another format

This command is only applicable to Vector data, for Raster data, use the **Translate** command from *Raster > Conversion > Translate*



Reading and writing KML for use in Google Earth is supported as standard in QGIS