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# QUO VADIS - QGIS

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Give a Basic Introduction to Free and Open Source Software (FOSS)

Give an Overview on FOSS for Geoinformatics (FOSS4G)

Talk on QGIS and Introduce the Basic Concepts of Software

# A Basic Introduction to Free and Open Source Software (FOSS)



GNU



“Free software is a matter of the user’s freedom to run, copy, distribute, study, change and improve the software. More precisely, it means that the programs’s users have the four essential freedoms:

- The freedom to run the program, for any purpose (freedom 0).
- The freedom to study how the program works, and change it so it does your computing as you wish (freedom 1). Access to the source code is a precondition for this.
- The freedom to redistribute copies so you can help your neighbor (freedom 2).
- The freedom to distribute copies of your modified versions to others (freedom 3). By doing this you can give the whole community a chance to benefit from your changes. Access to the source code is a precondition for this”.

-from the Free Software Definition  
<http://www.gnu.org/philosopy/free-sw.html>

FREE DOES NOT MEAN GRATIS – BUT, SOMETHINGS IS IN THE AIR

The beauty of open source GIS is that there are thousands of hardworking individuals across the globe that are working to advance the open source projects further, faster – and go beyond the traditional boundaries of geospatial technologies.

**Boundless CEO, Andy Dearing**

„WHY WE CODE“?

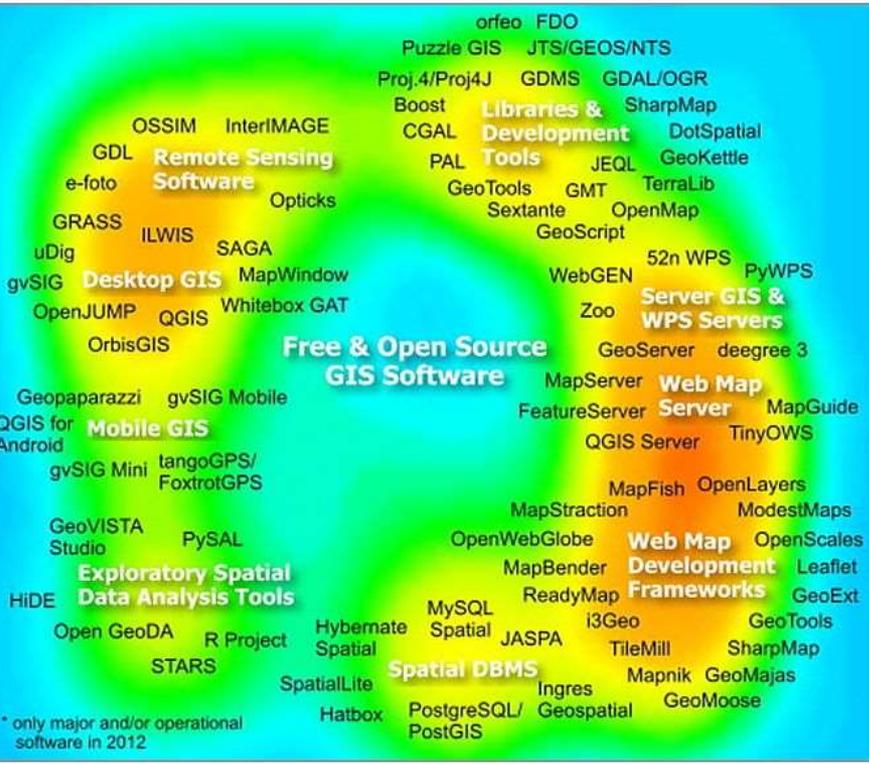
There's a lot of easy answers, which are variations of pure propaganda. They are mythic answers, emotional ones, they are easy to visualize

"Freedom!" is a *favourite*.

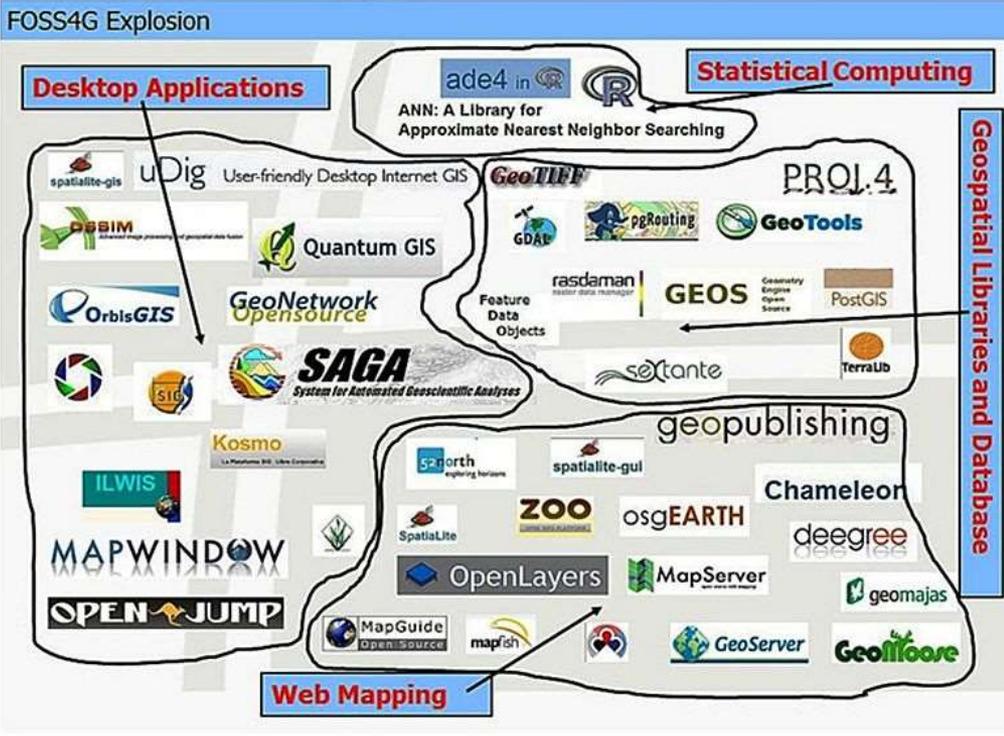
Software free to be read, free to modify, and free to redistribute with modifications. We code free software for idealism.

**FOSS4G Keynote, 2017, Paul Ramsey**

# FOSS - Explosion



Source: Steinger and Hunter, 2011.



Source: Horvat, 2014.

# FOSS – Desktop GIS

GIS Project (founding year)	webpage	user focus <sup>1</sup>	data focus <sup>2</sup> (raster vs. vector)	Platform	
				operating systems	language
GRASS (1982)	<a href="http://grass.osgeo.org">grass.osgeo.org</a>	experienced,... , research	more raster	MS-Windows, Linux, MacOSX	C, Tcl/Tk, Python
Quantum GIS (2002)	<a href="http://qgis.org">qgis.org</a>	novice,..., research	more vector	MS-Windows, Linux, MacOSX	C++, Qt4, Python
ILWIS Open (1984/5)	<a href="http://ilwis.org">ilwis.org</a>	novice,..., research	raster and vector	MS-Windows, Linux	MS Visual C
uDig (2004/5)	<a href="http://udig.refractorions.net">udig.refractorions.net</a>	novice,..., research	more vector	MS-Windows, Linux, MacOSX	JAVA
SAGA (2001/2)	<a href="http://saga-gis.org">saga-gis.org</a>	novice,..., research	more raster	MS-Windows, Linux	MS Visual C
OpenJUMP (2002/3)	<a href="http://openjump.org">openjump.org</a>	novice,..., research	vector	MS-Windows, Linux, MacOSX	JAVA
MapWindow (1998)	<a href="http://mapwindow.org">mapwindow.org</a>	novice,..., research	raster and vector	MS-Windows	MS Visual Studio .Net
gvSIG (2003)	<a href="http://gvSIG.gva.es">gvSIG.gva.es</a>	novice,..., research	more vector	MS-Windows, Linux, MacOSX	JAVA

<sup>1</sup> user levels: (i) novice (viewing), (ii) experienced (editing, simple analysis), (iii) expert (analysis), (iv) research (scripting, programming)

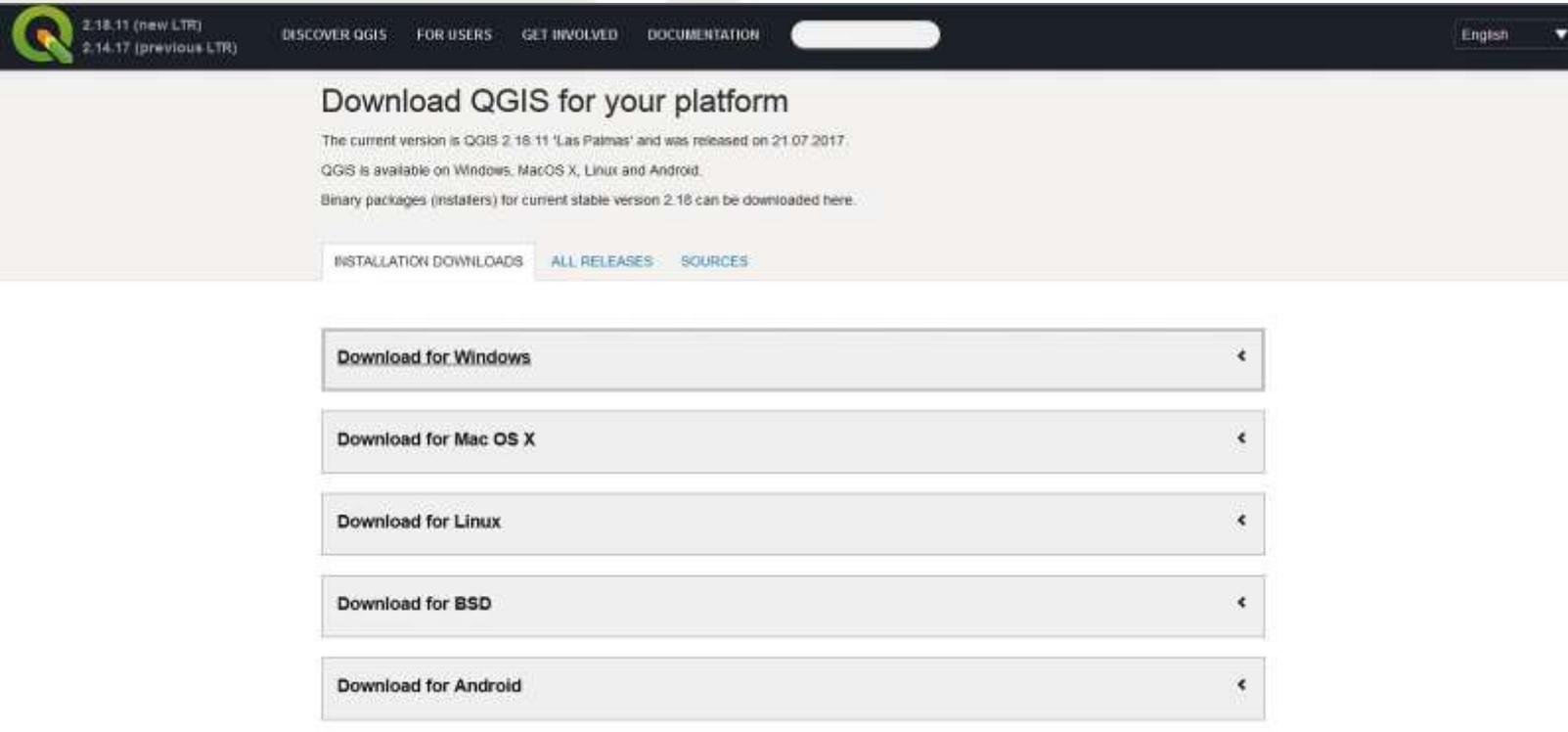
<sup>2</sup> data focus: subjective evaluation with respect to (i) software history and (ii) number of functions for raster and vector data editing and analysis

Source: Steiniger and Hay, 2009.

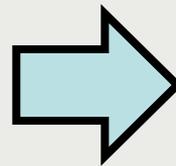
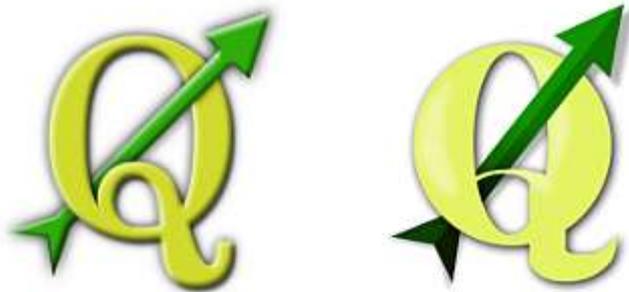
+ WHITEBOX:

<http://www.uoquelph.ca/~hydrogeo/Whitebox/>

# QGIS –Introduction to basic concepts

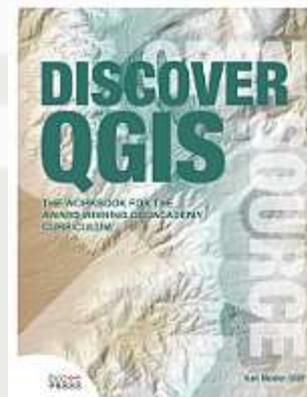
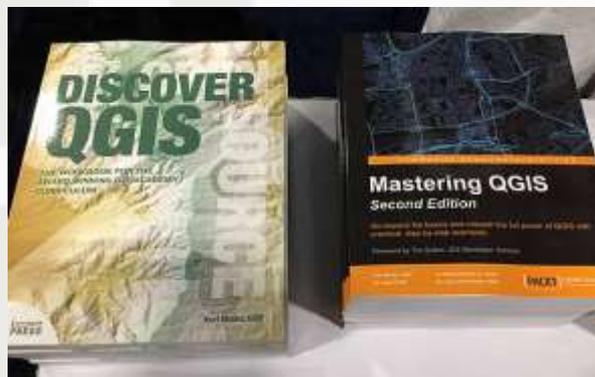
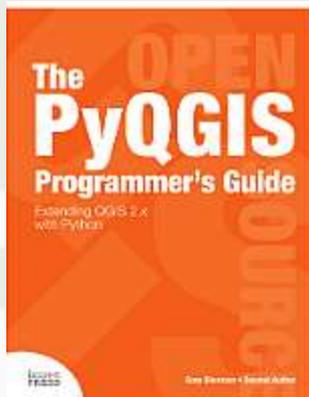
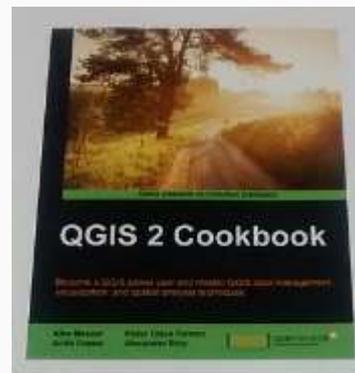
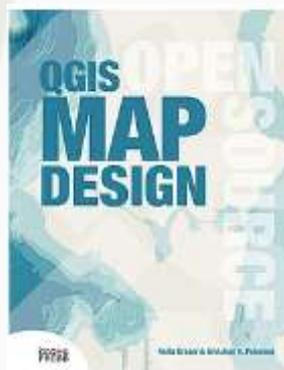
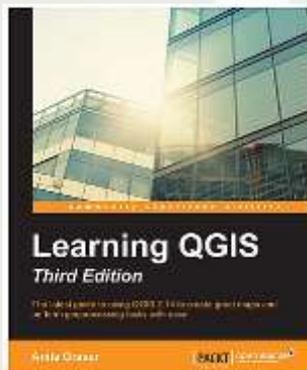
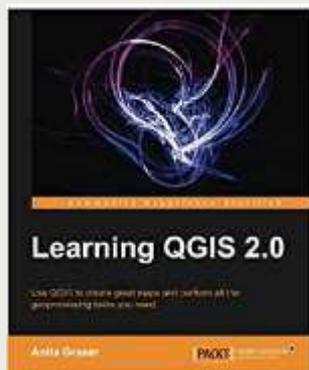


The screenshot shows the QGIS website's download page. At the top, there is a navigation bar with the QGIS logo, version information (2.18.11 (new LTR) and 2.14.17 (previous LTR)), and links for DISCOVER QGIS, FOR USERS, GET INVOLVED, and DOCUMENTATION. A language dropdown menu is set to English. The main heading is "Download QGIS for your platform". Below this, it states: "The current version is QGIS 2.18.11 'Las Palmas' and was released on 21.07.2017. QGIS is available on Windows, MacOS X, Linux and Android. Binary packages (installers) for current stable version 2.18 can be downloaded here." There are three tabs: "INSTALLATION DOWNLOADS" (selected), "ALL RELEASES", and "SOURCES". Below the tabs are five buttons for downloading on different platforms: "Download for Windows", "Download for Mac OS X", "Download for Linux", "Download for BSD", and "Download for Android".



The QGIS upgrade from version 2 to version 3 brings new features. The main change is access to new versions of Qt and Python. On HiDPI screens, the QGIS 3 user interface will significantly improve. QGIS 3 is not just a step towards new

# QGIS – Manual, Books...



## Books

### English

*Open the Door to GIS - Student and Teacher's Edition*

*QGIS Python Programming Cookbook - Second Edition*

*QGIS: Becoming a GIS Power User*

*Mastering QGIS - Second Edition*

*Discover QGIS*

*QGIS 2 Cookbook*

*Learning QGIS - Third Edition*

*QGIS Map Design*

*Mastering QGIS*

*QGIS Blueprints*

*QGIS By Example*

*The PyQGIS Programmer's Guide - Extending QGIS with Python*

*The QGIS Training Manual - A Comprehensive Introduction to Quantum GIS*

QGIS has a great online manual, case studies, training material, books and a number of „how-to” QGIS examples written by people who use QGIS

# QGIS - Layers

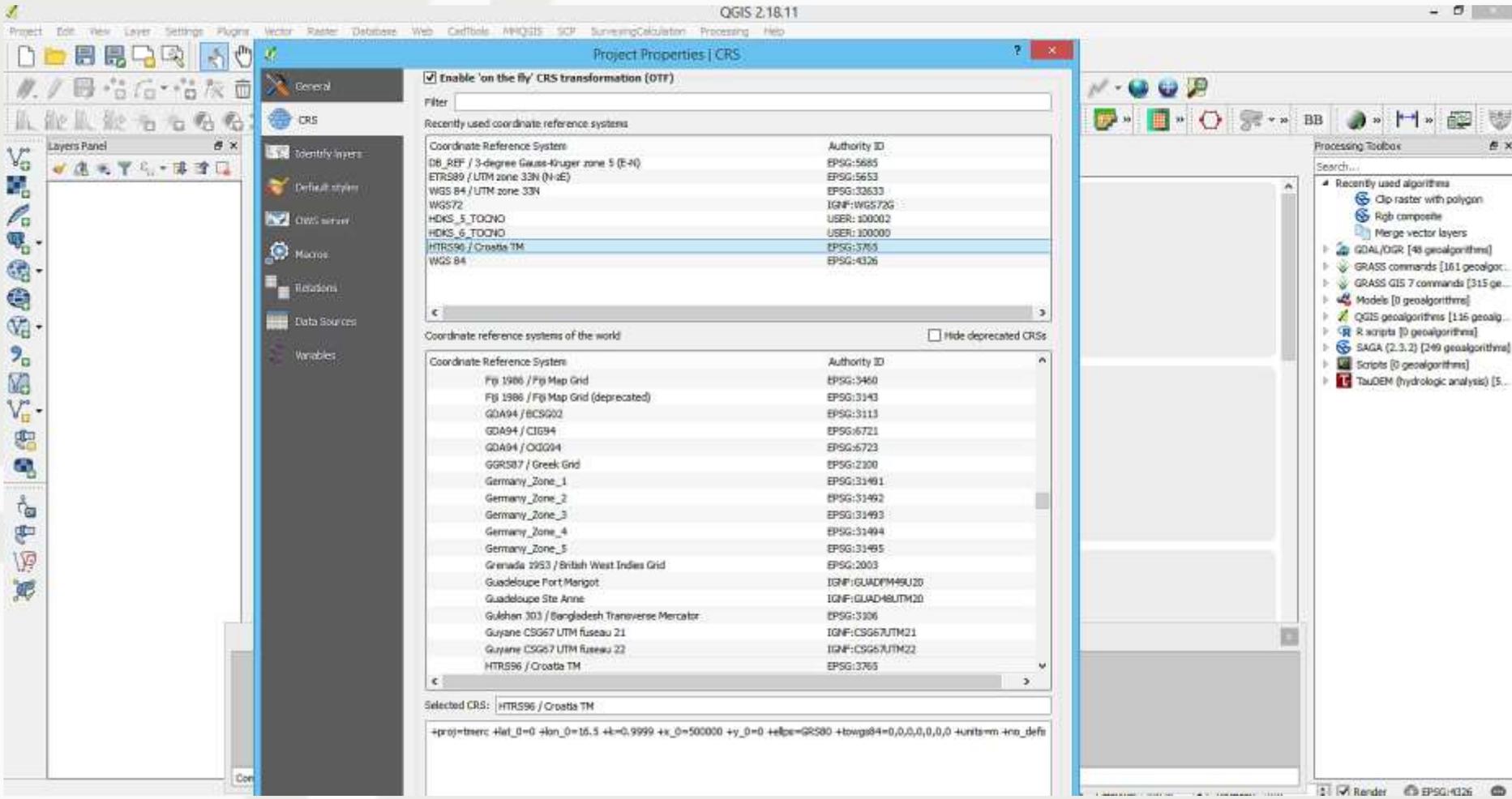
QGIS 2.18.7

The screenshot displays the QGIS 2.18.7 interface. The 'Layer' menu is open, showing a list of actions. The 'Add Layer' sub-menu is also open, listing various layer types and their keyboard shortcuts. The Layers Panel on the left is empty. The status bar at the bottom shows the coordinate 12.442, 45.534, a scale of 1:1.299.463, a magnifier at 100%, and a rotation of 0,0.

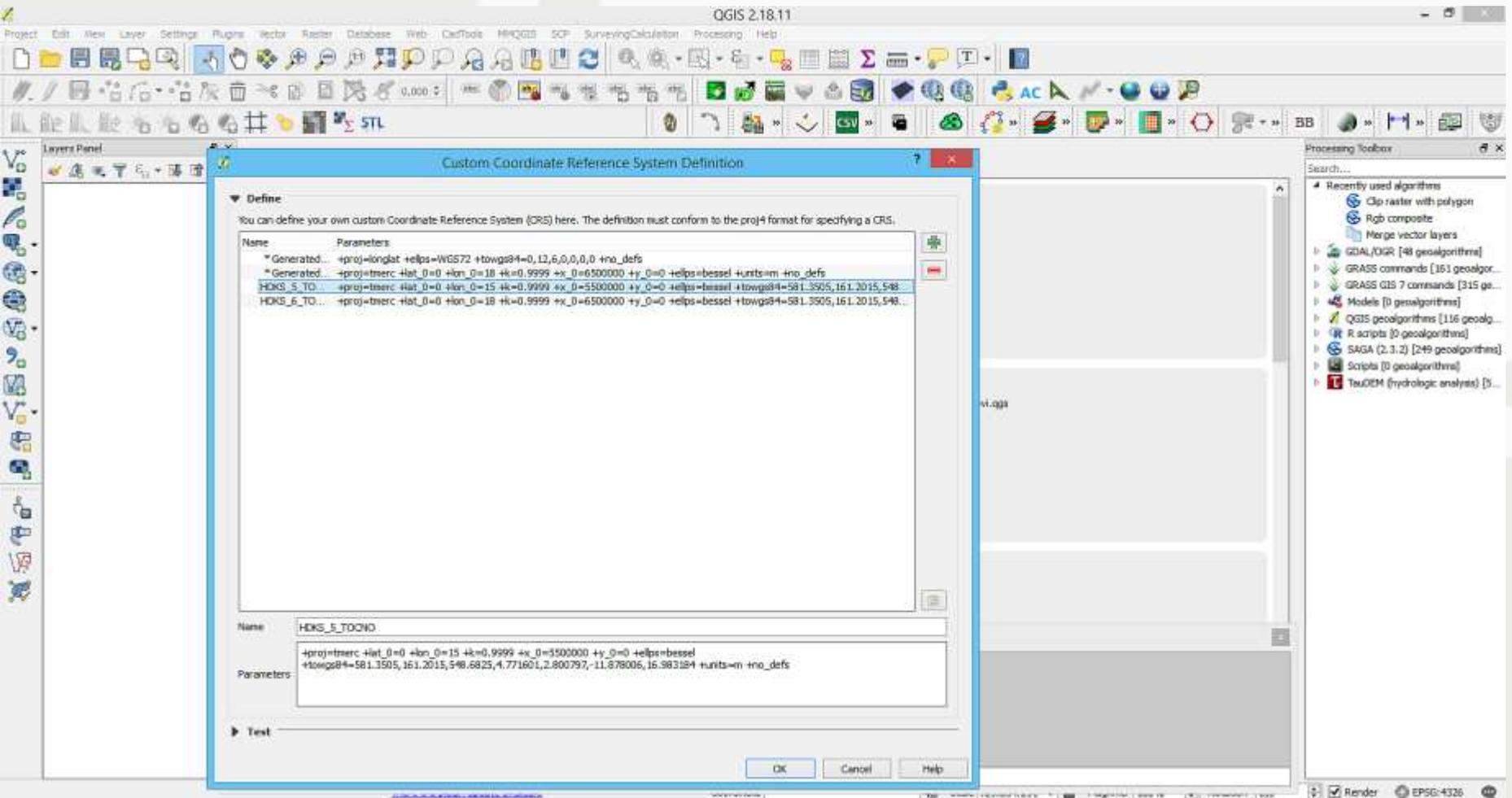
Layer Menu Item	Shortcut
Create Layer	
Add Layer	
Embed Layers and Groups...	
Add from Layer Definition File...	
Copy style	
Paste style	
Open Attribute Table	F6
Toggle Editing	
Save Layer Edits	
Current Edits	
Save As...	
Save As Layer Definition File...	
Remove Layer/Group	Ctrl+D
Duplicate Layer(s)	
Set Scale Visibility of Layer(s)	
Set CRS of Layer(s)	Ctrl+Shift+C
Set Project CRS from Layer	
Properties...	
Filter...	Ctrl+F
Labeling	
Add to Overview	
Add All to Overview	
Remove All from Overview	
Show All Layers	Ctrl+Shift+U
Hide All Layers	Ctrl+Shift+H
Show Selected Layers	
Hide Selected Layers	

Sub-menu Item	Shortcut
Add Vector Layer...	Ctrl+Shift+V
Add Raster Layer...	Ctrl+Shift+R
Add PostGIS Layers...	Ctrl+Shift+D
Add SpatialLite Layer...	Ctrl+Shift+L
Add MSSQL Spatial Layer...	Ctrl+Shift+M
Add DB2 Spatial Layer...	Ctrl+Shift+2
Add Oracle Spatial Layer...	Ctrl+Shift+O
Add WMS/WMTS Layer...	Ctrl+Shift+W
Add ArcGIS MapServer Layer...	
Add Oracle GeoRaster Layer...	
Add WCS Layer...	
Add WFS Layer...	
Add ArcGIS FeatureServer Layer...	
Add Delimited Text Layer...	
Add/Edit Virtual Layer...	

# QGIS- On the fly reprojection



# QGIS- On the fly reprojection



The QGIS provides a number of plugins.

There are hundreds of plugins available as additional add-ons.

Some plugins are not just accessories but complete programs

# QGIS – Plugins - SCP

QGIS 2.18.7

Project Edit View Layer Settings Plugins Vector Raster Database Web CadTools MMQGIS SCP SurveyingCalculation Processing Help

Download images Tools Preprocessing Postprocessing Band calc Band set Batch Settings About

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Login <https://ers.cr.usgs.gov>

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Search area

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Search

Satellites  Date from  to  Max cloud cover (%)

Results  Filter

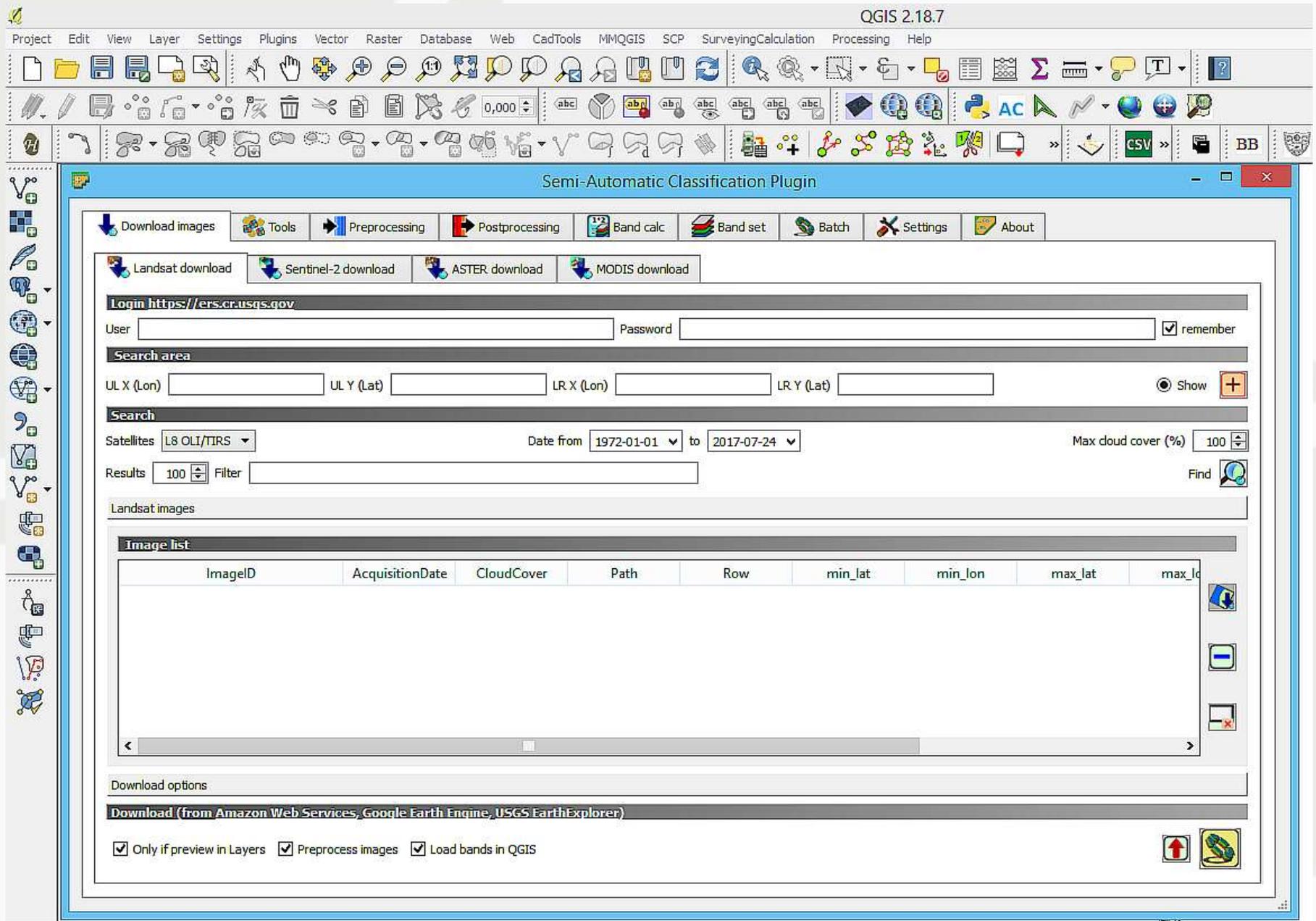
Landsat images

ImageID	AcquisitionDate	CloudCover	Path	Row	min_lat	min_lon	max_lat	max_lon
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Download options

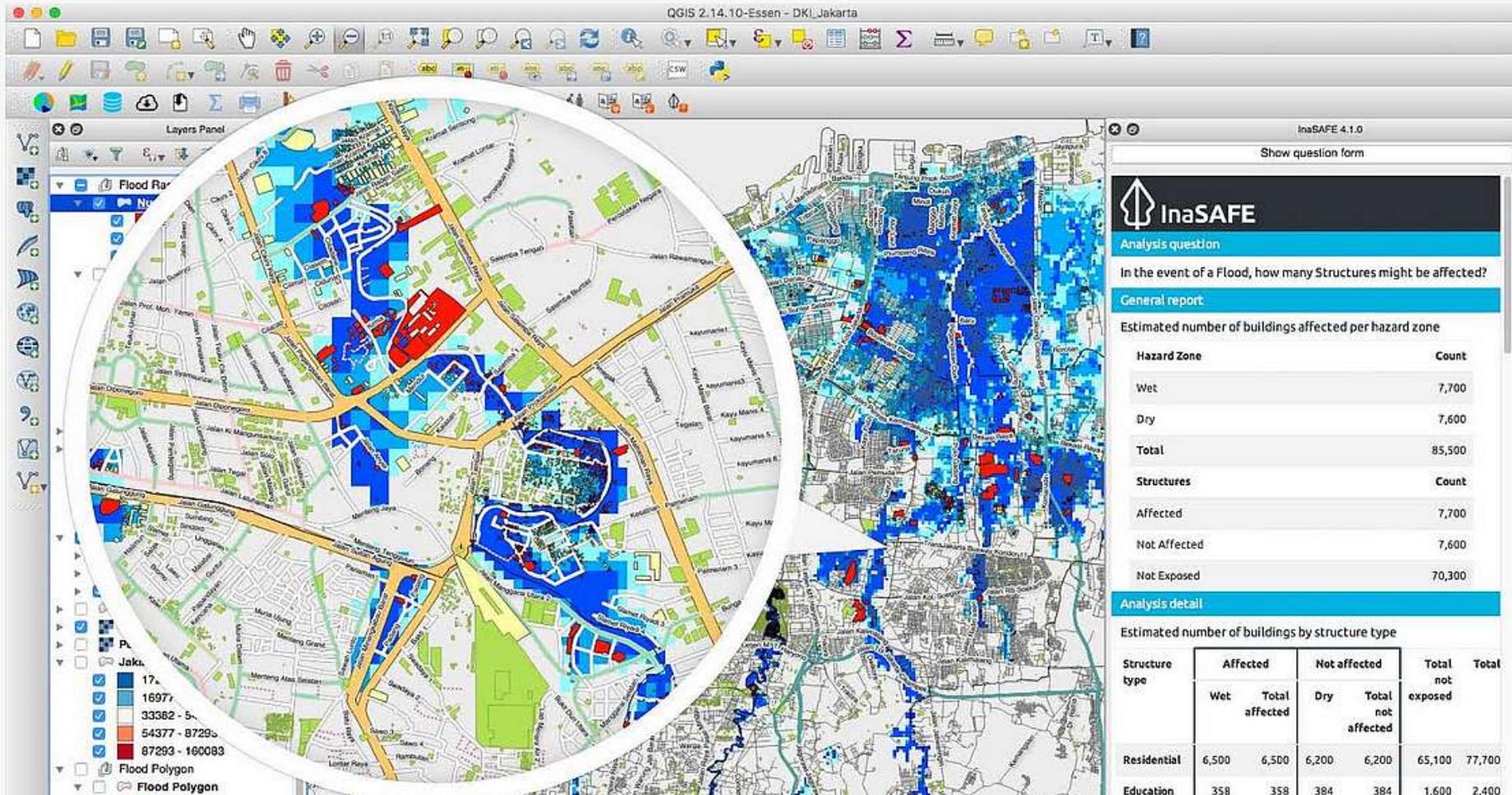
**Download (from Amazon Web Services, Google Earth Engine, USGS EarthExplorer)**

Only if preview in Layers  Preprocess images  Load bands in QGIS



# QGIS – Plugins - InaSAFE

**InaSAFE** is free software that produces realistic natural hazard impact scenarios for better planning, preparedness and response activities. It provides a simple but rigorous way to combine data from scientists, local governments and communities to provide insights into the likely impacts of future disaster events.

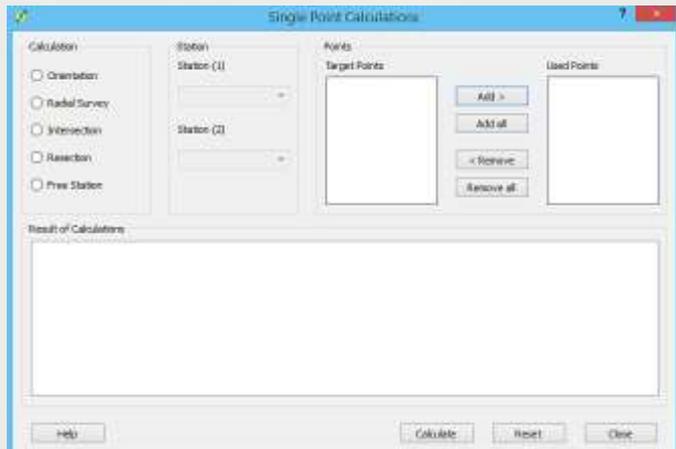
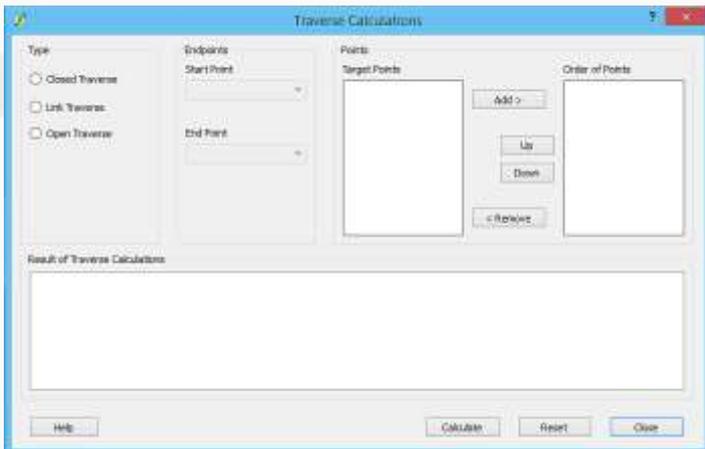
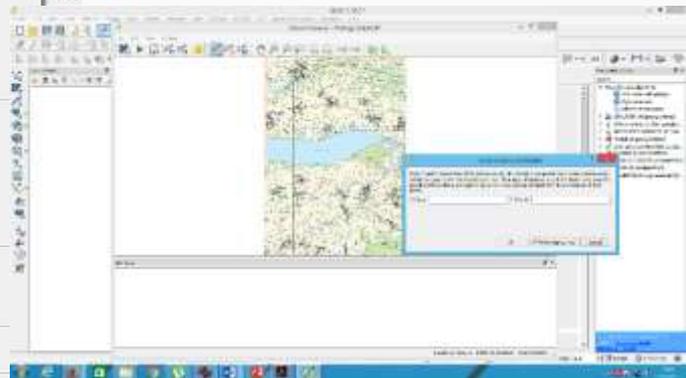
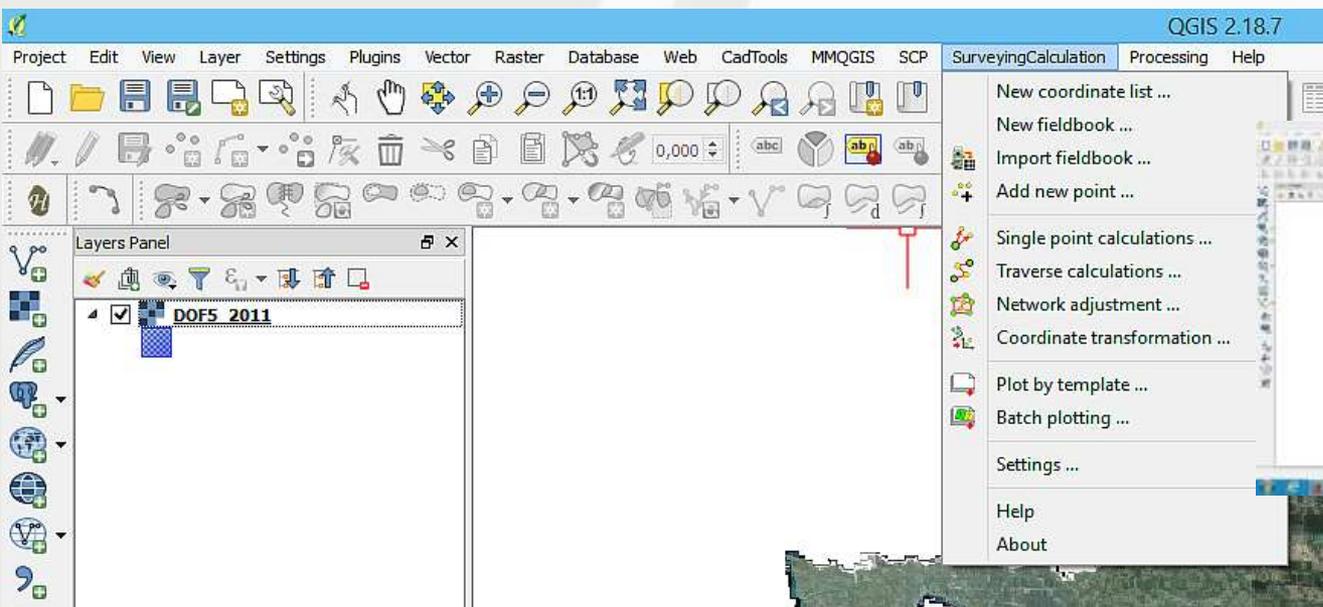


Basemaps refers to a collection of GIS data and/or orthorectified imagery that form the background setting for a map. The function of the basemap is to provide background detail necessary to orient the location of the map and edit vector data. Basemaps also add to the aesthetic appeal of a map.

The OpenLayers Plugin gets number one because it allows to add a number of basemap services to your map canvas:

- Google
  - Physical
  - Streets
  - Hybrid
  - Satellite
- OpenStreetMap
- Yahoo
  - Street
  - Hybrid
  - Satellite
- Bing
  - Road
  - Aerial
  - Aerial with labels
- MapQuest
- Apple Maps

# QGIS – Plugins and Surveying

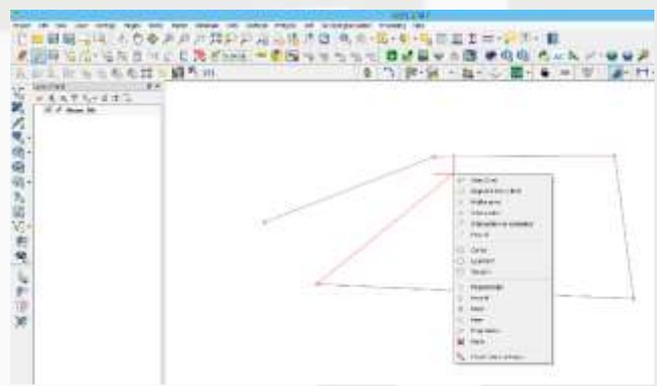
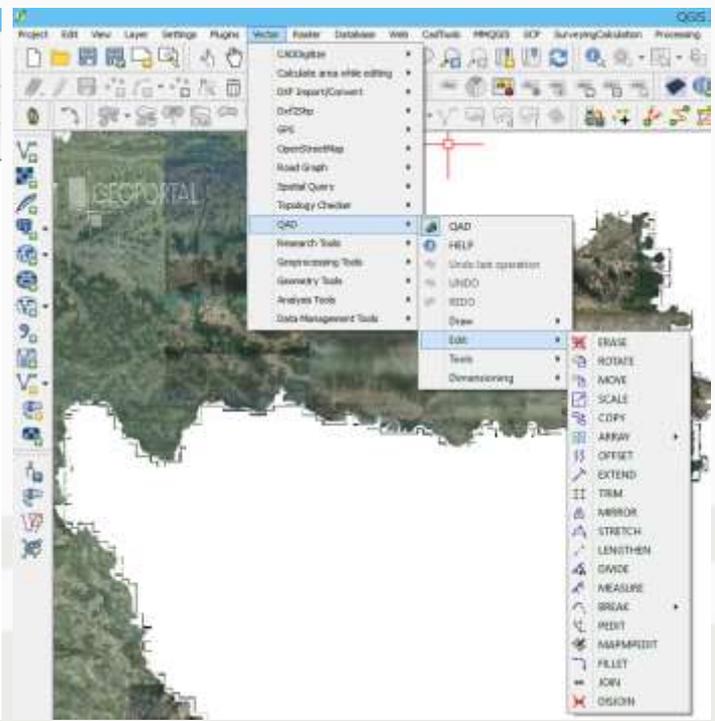
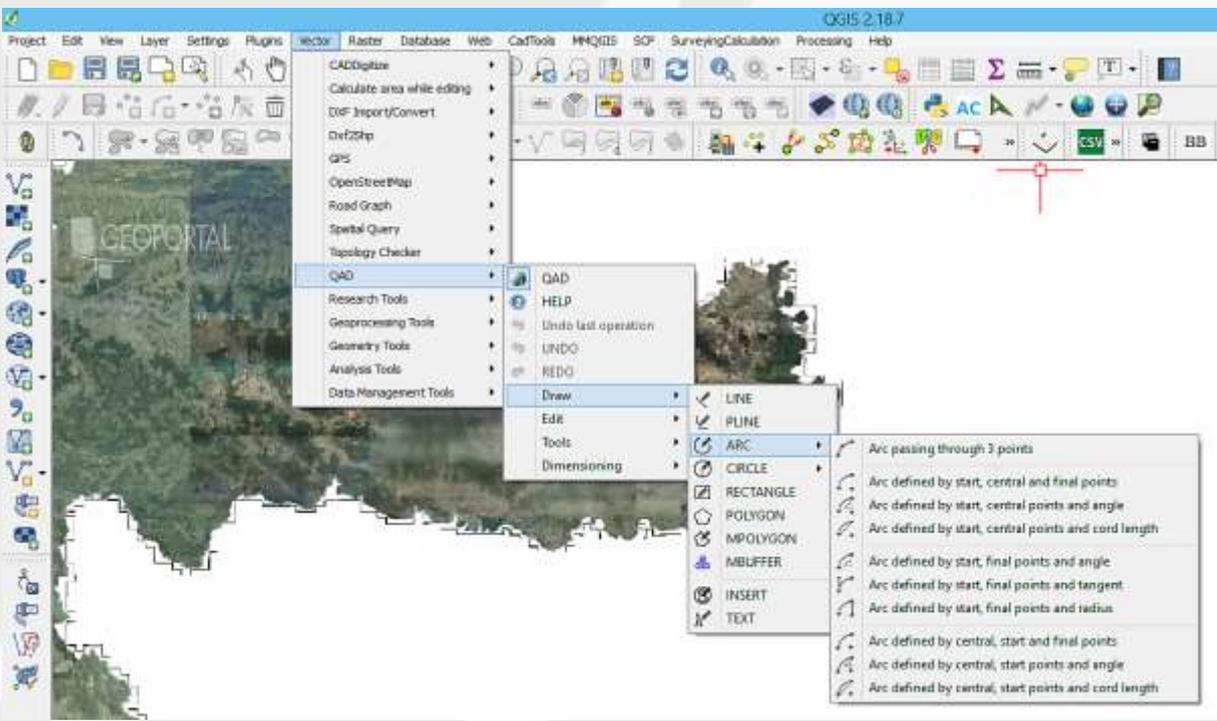


The cartographic capabilities of QGIS are sufficient to produce almost all the common map layout components with an adequate amount of advanced capabilities and even some options.

Cartography is where many people think that QGIS falls short (AutoCAD???)

But, the fact is that QGIS has seen remarkable growth in the cartographic capabilities in recent years

# QGIS and Cartography



Over the last decade there has been an explosion in the numbers of users and developers of FOSS for Geoinformatics.

FOSS4G is increasingly gaining in importance, and has become a kind of alternative to the proprietary (closed) software.

Try FOSS4G (any), use them, make changes to the software, share your new knowledge with OSS community, solve your GIS tasks, make money with FOSS.

**QGIS 3.0 - the new kid on the block**

**Thank you for  
your attention!**

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<http://www.zlatko-horvat.com>