Open-Alaqs Install Instructions

The following text provides a guide for the installation of Quantum GIS and Open-ALAQS. Instructions are also provided regarding necessary technical specifications (plugins, libraries, licences, etc.).

1. Install Quantum GIS

Quantum GIS is a free and open source Geographic Information Systems (GIS) application available under the GNU Free Documentation License. Information on QGIS are available in the online documentation ([A Gentle Introduction to GIS](https://docs.qgis.org/2.18/en/docs/gentle_gis_introduction/index.html)) as well as the software’s [User Guide](https://docs.qgis.org/2.18/en/docs/user_manual/index.html). It is recommended to read this material before using Open-ALAQS as it will greatly improve the overall user experience.

To download the compiled installer for Quantum GIS for Windows, go to:

<http://qgis.org/downloads/>

and download the desired version of QGIS. Since Open-ALAQS is coded in Python 2, it is necessary to choose an appropriate QGIS version. It is recommended to choose the 64-bit v2.18 of QGIS (named “Las Palmas”) which is available [here](http://download.osgeo.org/qgis/win64/). The QGIS community of developers is very active and several new releases are produced each year. Open-ALAQS has been tested with all previous versions up to **v2.18.28.2** (released on 26-Jan-2019).



The latest Open-ALAQS version makes use of a few external Python libraries that need to be installed from within QGIS which is shipped with its proper Python installation. This can be easily achieved using Python’s **pip**[[1]](#footnote-1) command. However, depending on the Python version included in QGIS, pip might not be available in QGIS or compatible with the latest installation requirements of Open-ALAQS. Thus, **it is recommended to use the latest version of QGIS version (v2.18.28)**, which has Python version 2.7.14 installed, in order to make sure that your software is up to date.

Once the installer is downloaded, run the installer and follow the instructions. Normally, the default installation options are sufficient. You may want to install the default data sets offered during the installation if you wish to complete separate QGIS tutorials, but this is not essential.

Upon completing this first step, **right-click on the shortcut “*QGIS Desktop 2.18.28”* and choose “*Run as administrator*” as shown in Fig. 1**. This will allow you to install all the other libraries that are needed to run Open-ALAQS.

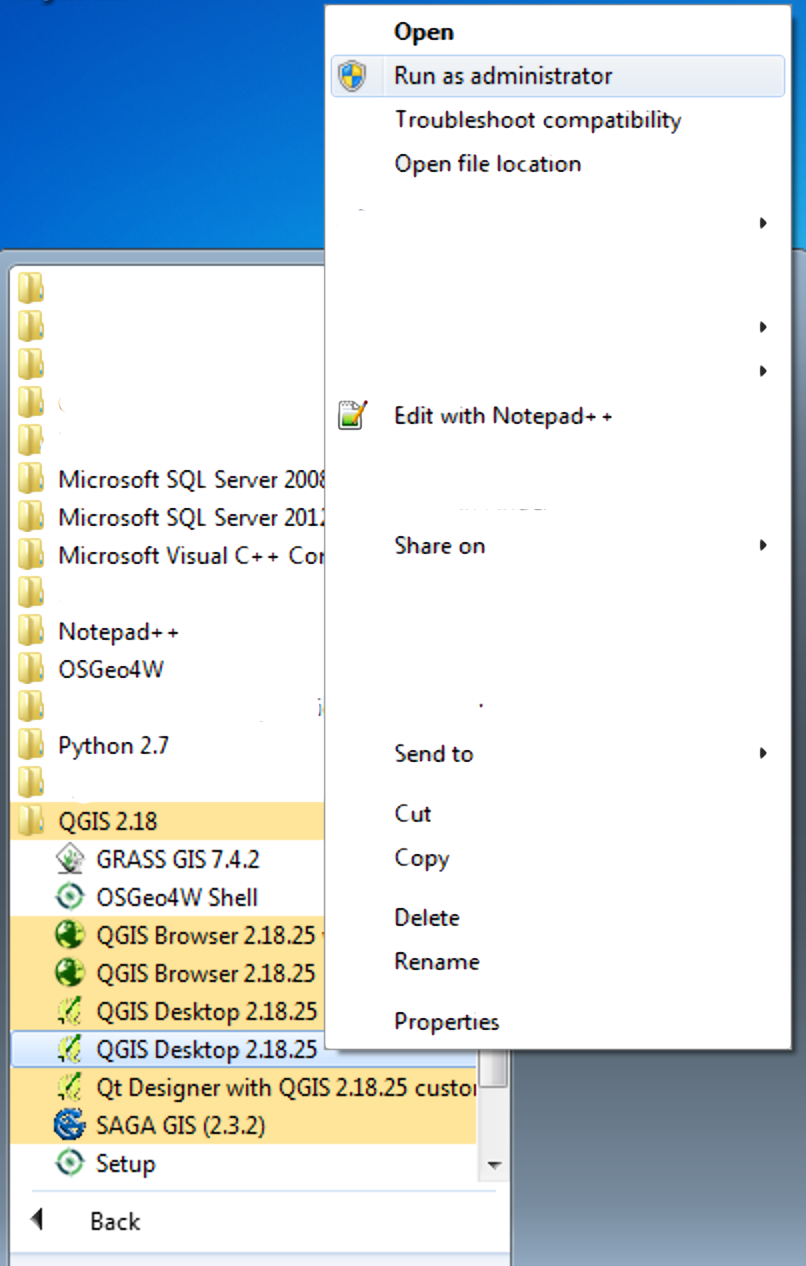


Figure 1: Installing Open-ALAQS requires opening QGIS as administrator.

## Python Console in QGIS

The QGIS Python Console[[2]](#footnote-2) is an interactive shell for the Python command executions. It can also be used to install external Python libraries. To open the console, go to the QGIS toolbar and click on *Plugins,* then to *Python Console* as shown in Fig. 2.It will appear in the bottom part of the QGIS window (see **Fig. 3**).

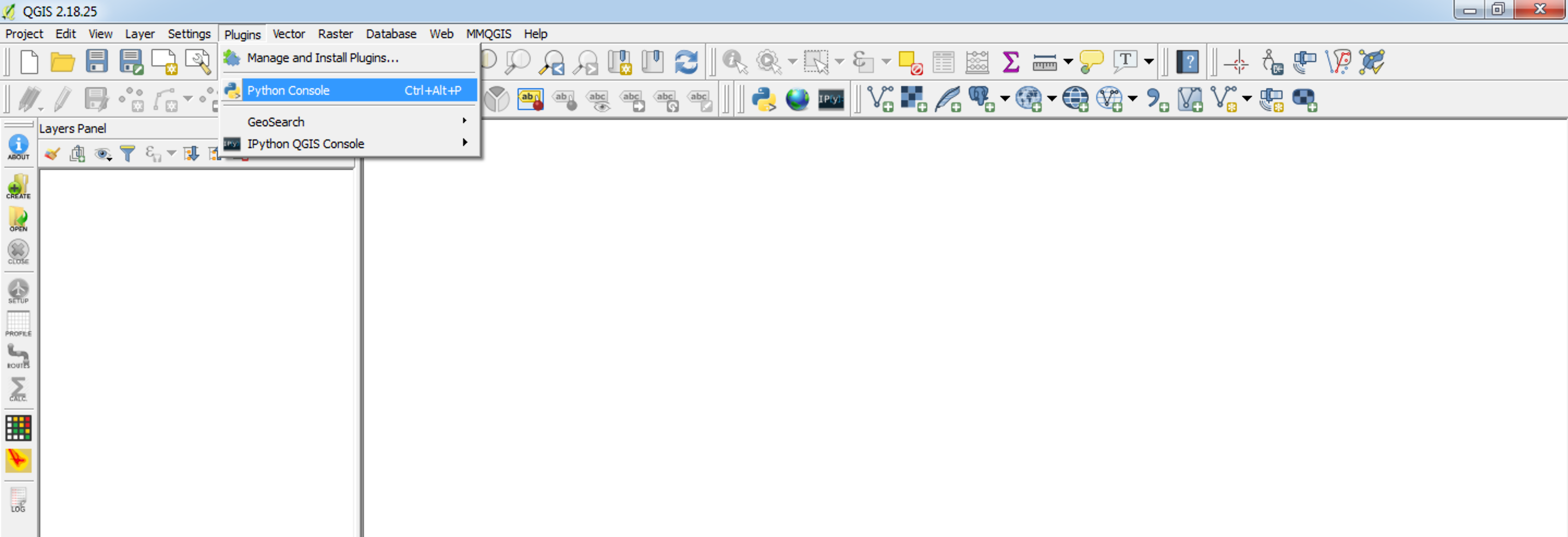
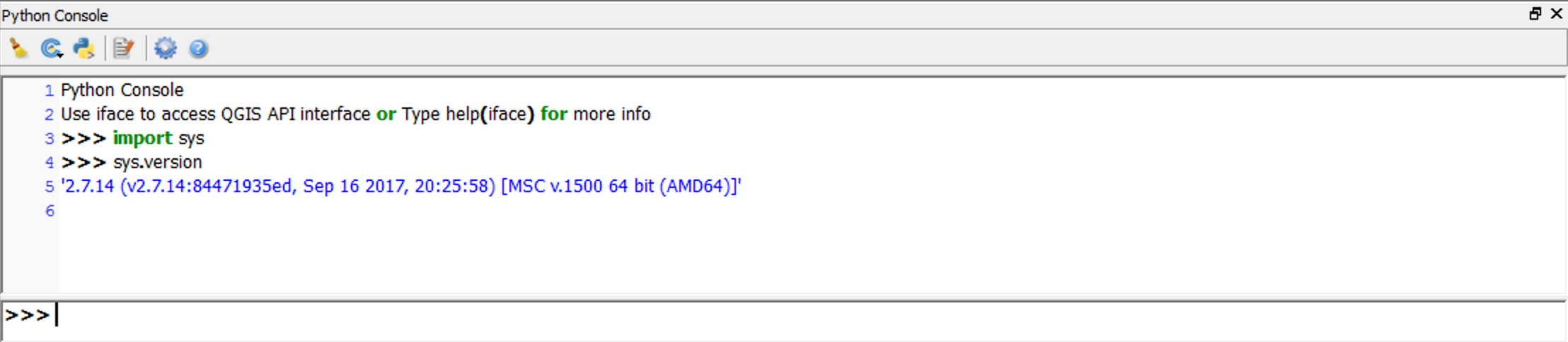
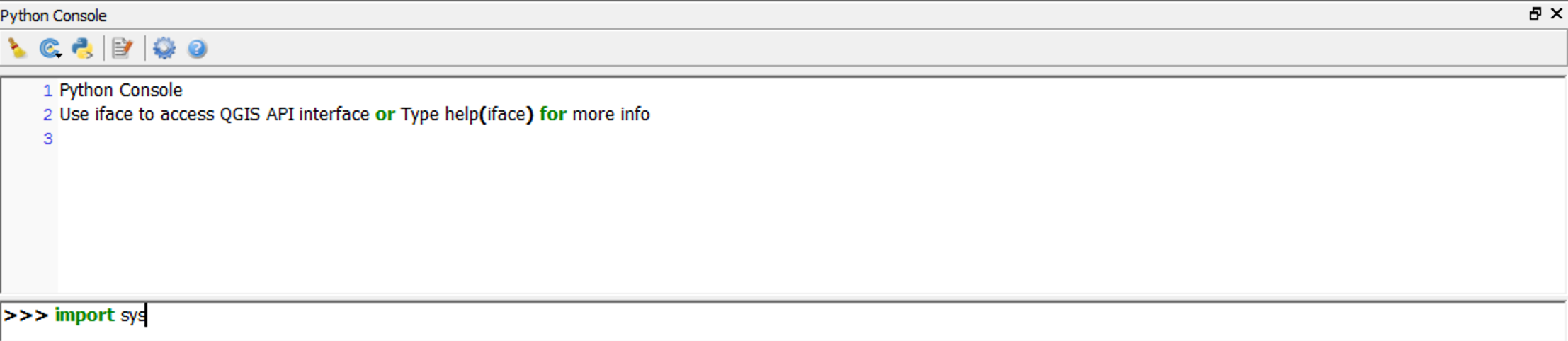


Figure 2: To open the QGIS Python console go to ***Plugins ‣ Python Console***.

Before proceeding to the installation of the necessary external Python libraries, verify that the QGIS Python installation is compatible with the latest installation requirements of Open-ALAQS.

Figure 3: The Python Console appears in the bottom part of the QGIS window.

First, type **import sys** in the console (see Fig. 4) and hit **Enter.** Next, type **sys.version** in the console and hit **Enter**.

Figure 4: Verify QGIS’s Python version using the Python console.

The Python version of the QGIS installation should be visible on the screen as shown in see **Fig. 4**. If the QGIS 2.18.x Python is older than 2.7.9 it might not be possible to install packages and you should consider updating QGIS.

1. Installing Packages From The Python Console In QGIS

## General information and requirements

Open-ALAQS relies on the following open-source extension packages:

1. [Geographiclib](http://geographiclib.sourceforge.net/): Used for performing geographic transformations and for solving geodesic problems.
2. [Geopandas](http://geopandas.org/) (and [Pandas](https://pandas.pydata.org/index.html)): These packages provide high-performance, easy-to-use (geo)data structures and (geo)data manipulation and analysis tools.
3. [Shapely](https://pypi.org/project/Shapely/): Package for manipulation and analysis of planar geometric objects.

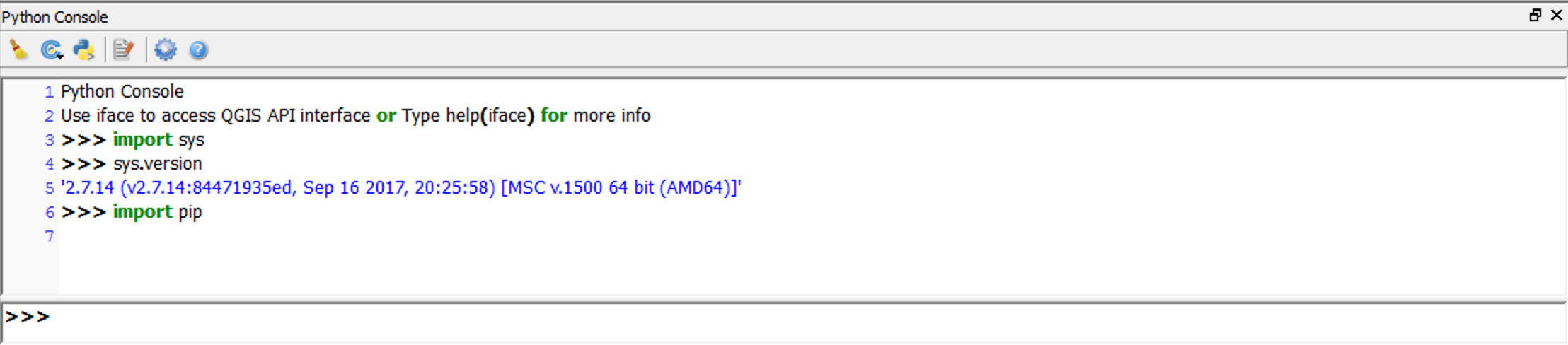
The easiest way to install them is to download the 64-bit Windows binaries from the following address: [*https://www.lfd.uci.edu/~gohlke/pythonlibs/*](https://www.lfd.uci.edu/~gohlke/pythonlibs/)and use pip to install them*.* These packages are available as whl[[3]](#footnote-3) (pronounced wheel) files. Locate the necessary files and download them:

* geographiclib‑1.49‑py2.py3‑none‑any.whl
* geopandas‑0.4.1‑py2.py3‑none‑any.whl
* pandas‑0.24.2‑cp27‑cp27m‑win\_amd64.whl
* Shapely‑1.6.4.post1‑cp27‑cp27m‑win\_amd64.whl

Note that the above file names reflect the latest available version (at the time of writing of this guide). **These files are also available in the Open-ALAQS folder “whl\_files”**. In case you want to download the latest version of these files make sure that the selected files correspond to the latest 64-bit (amd64) Python2.7 (cp27) version of these packages.

## Installing a Python package with pip

Before installing the aforementioned packages, verify that **pip** is correctly installed in your System by typing **import pip** in the console(don’t forget to click Enter). If no error message appears in the console you can proceed to the next step. You can also verify pip’s version by typing **pip.\_\_version\_\_** in the console. If your version is older than **'19.0.x'** consider updating the pip package.

******Figure 5: Verify that pip is available in QGIS

The first thing is to verify that the following path exists and contains the necessary .whl files: C:\Users\your\_user\_name\.qgis2\python\plugins\open\_alaqs\whl\_files[[4]](#footnote-4).

To install a .whl file (in this example *geographiclib‑1.49‑py2.py3‑none‑any.whl*) using pip, type the following commands in the Python console:

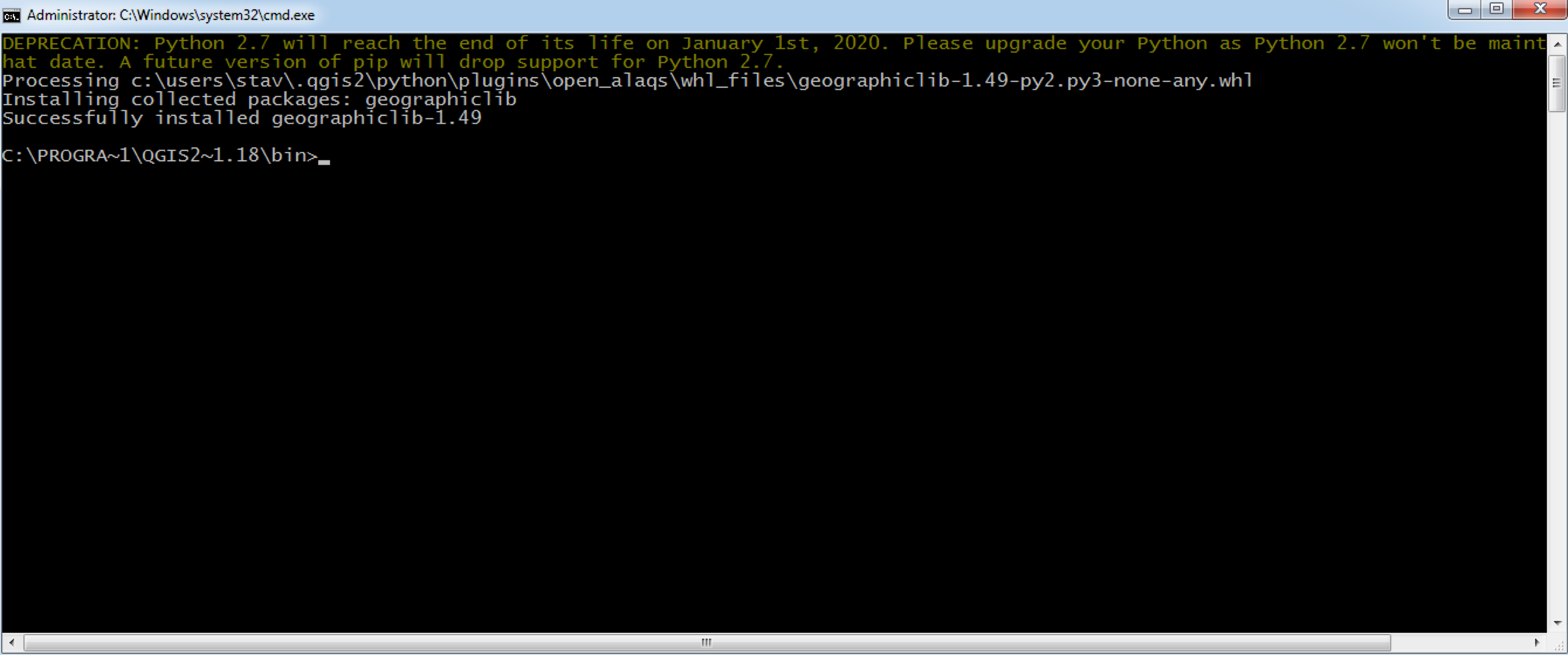
* import os
* os.system('python -m pip install -U --user C:\Users\your\_user\_name\.qgis2\python\plugins\open\_alaqs\whl\_files\geographiclib‑1.49‑py2.py3‑none‑any.whl')

Alternatively, it is possible to download and install a package with the following command:

* os.system('python -m pip install -U --user C:\Users\your\_user\_name\.qgis2\python\plugins\open\_alaqs\whl\_files\geographiclib')

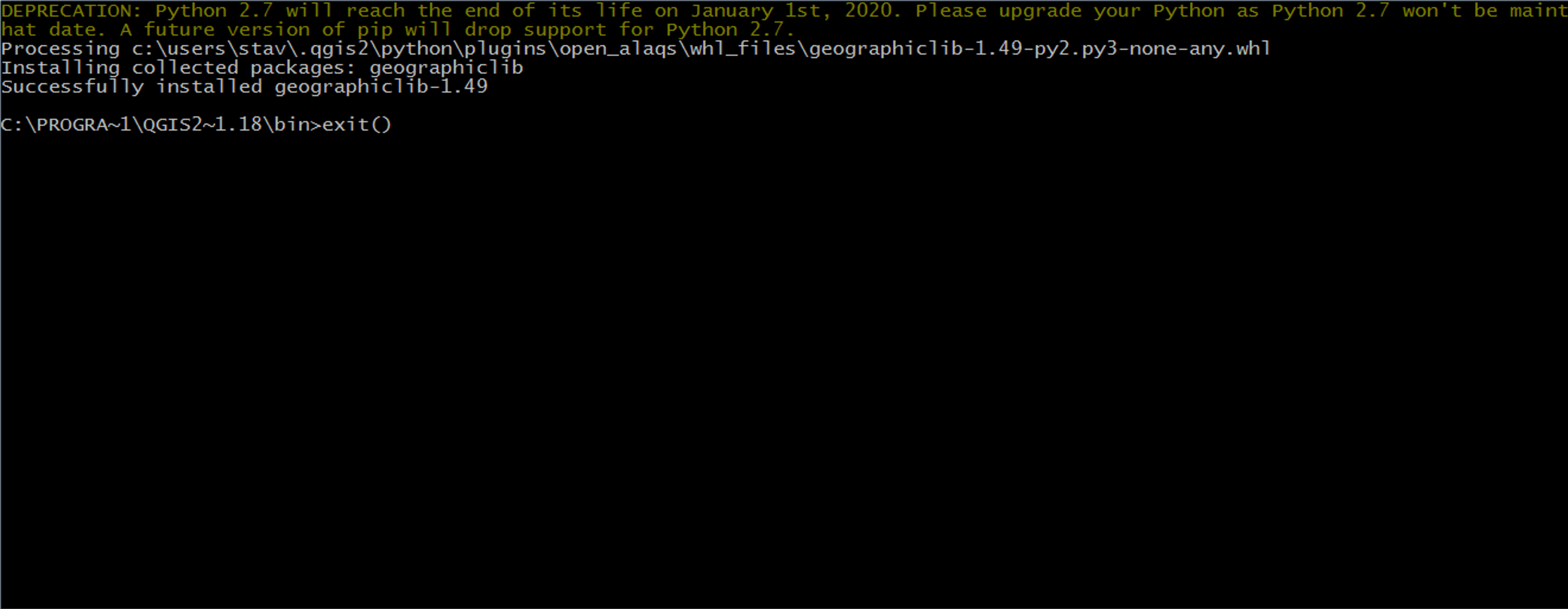
Once you hit Enter, a Windows Command Prompt window will appear (see Fig. 6) with information about the execution of the above command. In case of a successful installation, the following message should appear on your screen:

“**Successfully installed geographiclib‑1.49**”

Figure 6: Windows Command Prompt window with information about the installation of a python package (launched from the QGIS Python console)

However, this window will close itself immediately after the execution of the command. If you want to maintain the window open, so that you can have enough time to read all of the information provided there, execute the above command as:

* os.system('cmd /k python -m pip install -U --user C:\Users\your\_user\_name\.qgis2\python\plugins\open\_alaqs\whl\_files\geographiclib‑1.49‑py2.py3‑none‑any.whl')

Figure 7: Close the Windows Command Prompt window by typing exit()

When done, type exit() (and hit Enter) in the Windows Command Prompt to quit the window and return to the QGIS environment. If you chose the first option (i.e. without adding **cmd /k** to the command) and the installation was successful, a zero (**0**) should appear in the QGIS Python console right below the command as shown in Fig. 8.

A final way to make sure that the package is installed in the system is to type **import geographiclib** in the console. If no message appears, the package is available otherwise the following error will appear, indicating that the package is not installed:

ImportError: No module named geographiclib

The same procedure can be used to install the rest of the .whl files.



Figure 8: When installing a package using pip, zero (0) indicates the successful installation of a Python package.

We note that in some cases, complications related to library dependencies might come up while installing some packages. This is why more .whl files are included in the “whl\_files” folder. We recommend executing the aforementioned command for all available .whl files to ensure that the necessary packages are correctly installed.

## Installing a Python package with pip behind a proxy

If you’re behind a proxy, the main installation command needs to be modified as:

os.system('cmd /k python -m pip install -U --user *--proxy* [*http://user:pass@proxyAddress:proxyPort*](http://user:pass@proxyAddress:proxyPort) C:\Users\your\_user\_name\.qgis2\python\plugins\open\_alaqs\whl\_files\geographiclib‑1.49‑py2.py3‑none‑any.whl')

where:

* [*user*](http://user:pass@proxyAddress:proxyPort)*: your username (for ex. Open)*
* [*pass*](http://user:pass@proxyAddress:proxyPort) *: your password (for ex. Alaqs)*
* [*proxyAddress*](http://user:pass@proxyAddress:proxyPort)*: your proxy address (proxy.oa.com)*
* [*proxyPort*](http://user:pass@proxyAddress:proxyPort) *: your port number (for ex. 8080)*

According to the above example (don’t forget to replace the coloured text with your own user name and the right folder name containing Open-ALAQS), the appropriate command would be:

os.system('cmd /k python -m pip install -U --user *--proxy* [*http://Open:Alaqs@proxy.oa.com:8080*](http://Open:Alaqs@proxy.oa.com:8080) C:\Users\your\_user\_name\.qgis2\python\plugins\open\_alaqs\whl\_files\geographiclib‑1.49‑py2.py3‑none‑any.whl')

## Uninstalling a Python package with pip

Finally, in order to uninstall a specific package, just type in the console:

os.system('python -m pip uninstall C:\Users\your\_user\_name\.qgis2\python\plugins\open\_alaqs\whl\_files\geographiclib‑1.49‑py2.py3‑none‑any.whl')

1. Installing QGIS Plugins

QGIS provides the possibility to install external plugins to extend its functionality. The plugins are stored online in public or private repositories. Open-ALAQS is such a plugin. Before we install Open-ALAQS, it is useful to mention how to install, enable and disable other plugins[[5]](#footnote-5).

## Open Layers Python Plugin

This plugin allows geospatial data to be imported directly from online mapping services like Google Maps, Open Street Maps and Yahoo Maps. This is an extremely useful plugin for working on Open-ALAQS projects because it provides accurate images on which you can base your airport layout or key features that you can use to geo-reference AIP images.

To install the “OpenLayers Plugin” first open the **Plugin Manager** , by clicking on the menu item **Plugins ‣ Manage and Install Plugins** .

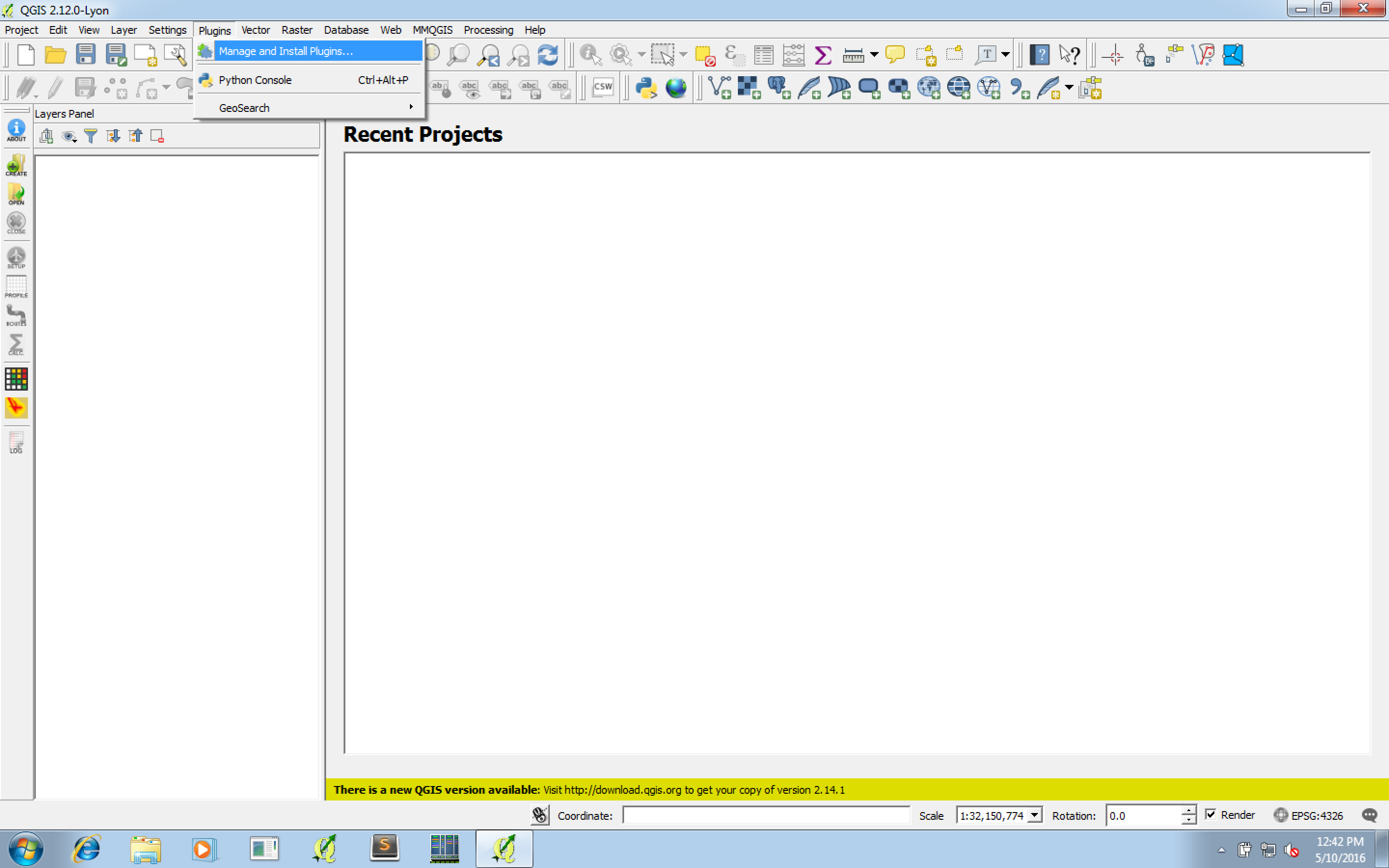
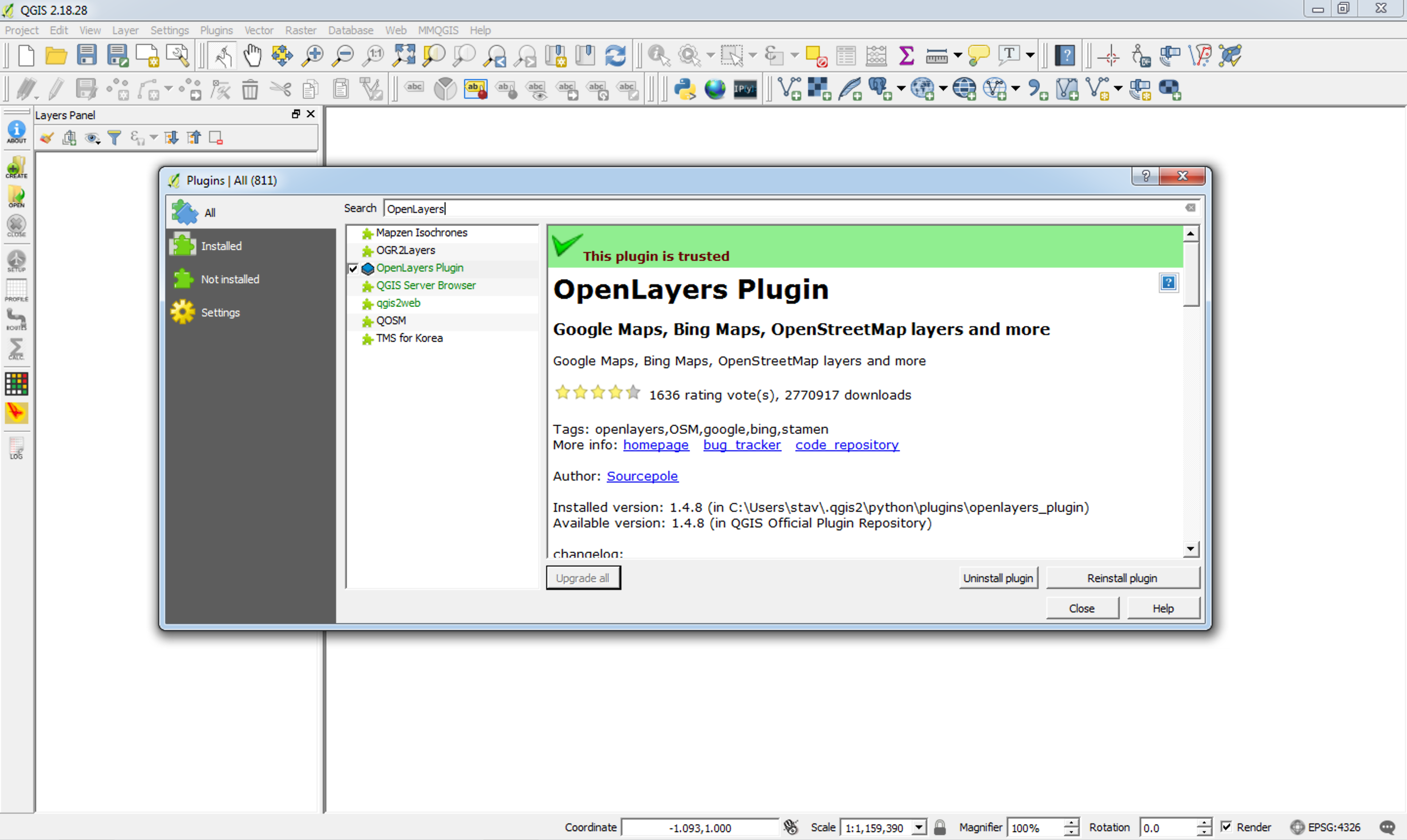


Figure 9: QGIS plugins can be downloaded, installed and activated from the Plugin menu item.

In the dialog that opens, find the ***OpenLayers*** plugin using the Search bar (see Fig. 10). A new dialog opens and tries to fetch all Python plugins from 3rd-party repositories. Use the 'Search' feature to find the “Open Layers Plugin”. Then select install to download and install the plugin to your QGIS environment. Make sure that the “OpenLayers Plugin” is enabled (the checkbox should be checked).

Figure 10: The Plugin Manager allows to find and install QGIS plugins

If the installation has been successful, you should see a new item under the menu item

menu item **Web ‣ OpenLayers plugin** containing a large selection of geo-spatial layers. Selecting any of these layers will add a new raster layer to your QGIS main screen.

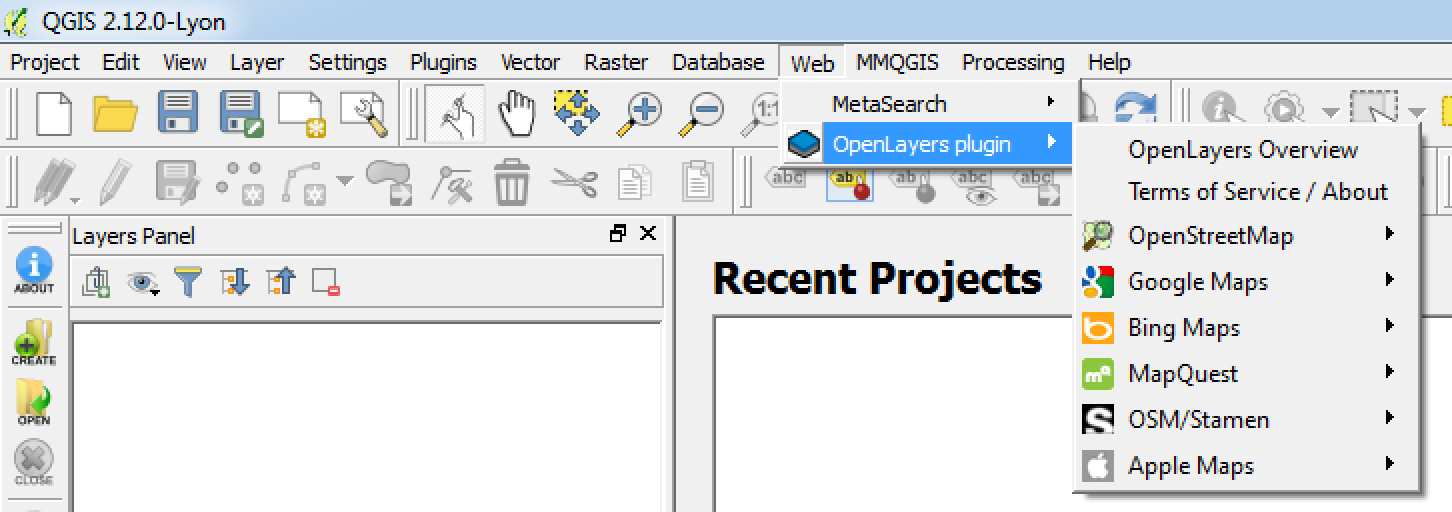


Figure 11: Once installed the OpenLayers plugins can be used from the menu item “Web”.

1. Installing Open-ALAQS

Open-ALAQS is distributed as a zip file which, when extracted, contains a single folder called Open-ALAQS. This file contains an entire plugin for QGIS and appends the QGIS system with all the functions needed to build, run, and analyse an Airport Local Air Quality Study.

To make this plugin visible to QGIS, you must copy it to the plugin’s directory. Note that the folder name where the Open-ALAQS are contained should not contain dashes (e.g. open-alaqs) but underscores are allowed (e.g. open\_alaqs).

Assuming you kept the default installation options for QGIS, there are two directories into which you could deploy the project:

* For most 3rd party plugins, the Open-ALAQS directory should be copied to:

**C:\users\YOUR\_USER\_NAME\.qgis\python\plugins**

* If this path is not available (please contact support before using this solution), then there is a second plugin directory (intended for QGIS core plugins) which can be found at:

**{YOUR\_QGIS\_PATH}\apps\qgis\python\plugins**

Having copied the plugin into the appropriate directory, restart QGIS. Following the same procedure as described above for “OpenLayers” will bring up a dialog window that displays all of the plugins currently available locally for QGIS.

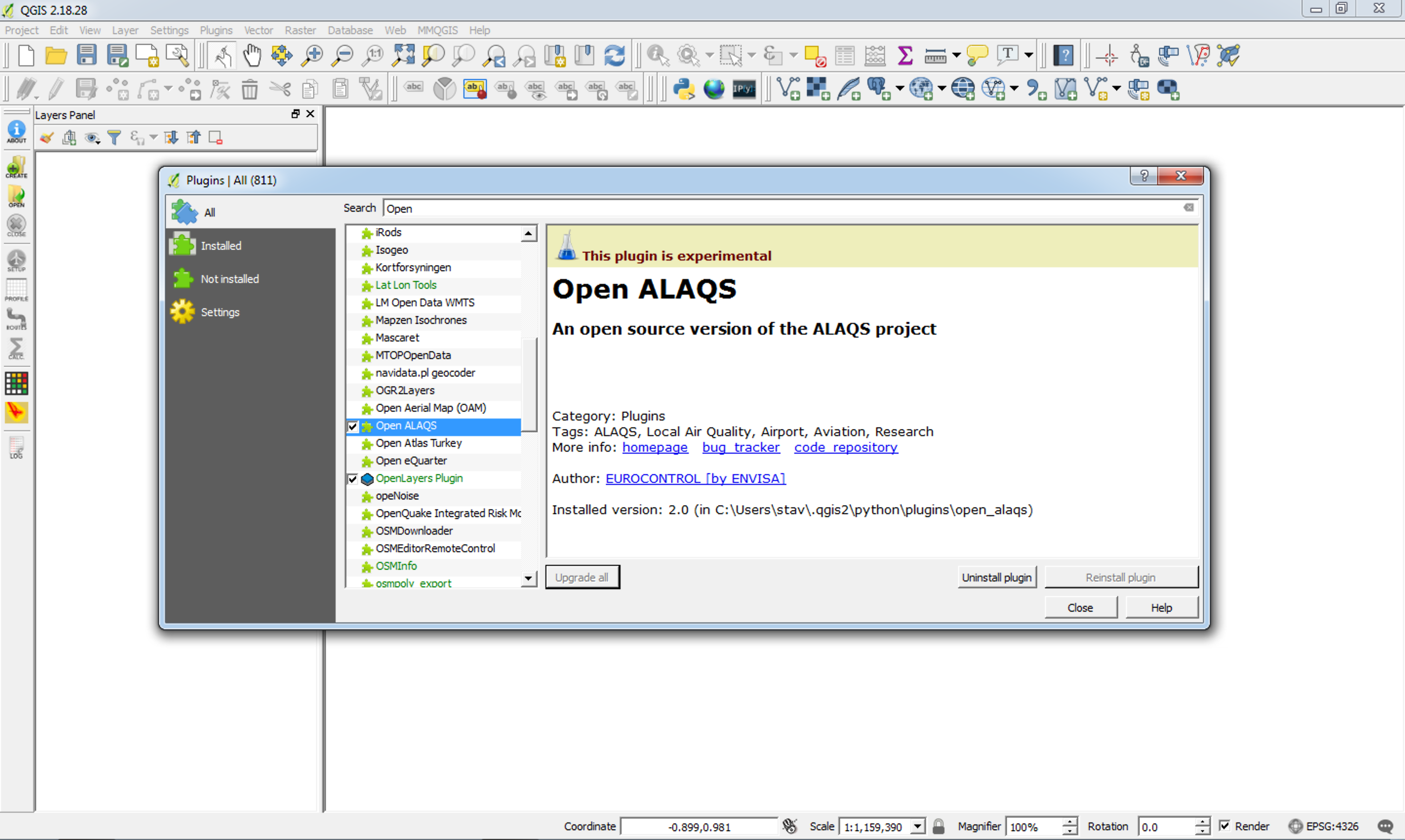


Figure 12: Once copied in the the Open-ALAQS plugin should be visible in the list of available plugins

Filter and activate the Open-ALAQS plugin. The Open-ALAQS toolbar (Fig. 13) should be available under the default QGIS toolbars.





Figure 13: The Open-ALAQS toolbar

That’s it, Open-ALAQS is now installed and ready to use.

1. The Python Package Installer (https://pip.pypa.io/en/stable/) [↑](#footnote-ref-1)
2. For more information: https://docs.qgis.org/2.18/en/docs/user\_manual/plugins/python\_console.html [↑](#footnote-ref-2)
3. “Wheel” is a built, archive format that can greatly speed installation compared to building and installing from source archives. [↑](#footnote-ref-3)
4. Replace the colored text with your own user name and the right folder name containing Open-ALAQS. [↑](#footnote-ref-4)
5. For more information, see the [QGIS documentation](https://docs.qgis.org/2.18/en/docs/training_manual/qgis_plugins/index.html). [↑](#footnote-ref-5)