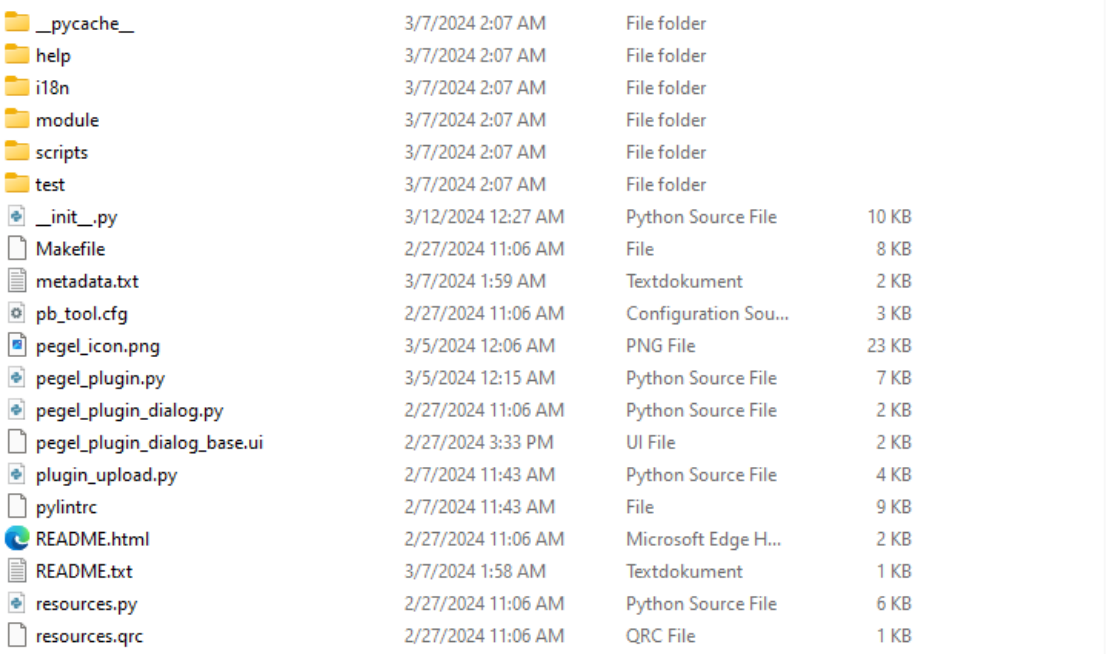
DOCUMENTATION OF PEGEL PLUGIN

Pegel Plugin

Water is one of the most crucial matters not only for humans but also for living creatures on earth. Besides the existence of water, managing water is a key factor for its consistency. Analyzing water quality, transportation, measurement of water level, some examples we need to keep water consistency. Therefore, there are many institutions that serve important taskforces. One of the institutions is Pegel. Pegel, with its many stations across Germany, provides diverse measurements for instance current water level, water temperature and miscellaneous. This plugin was developed for QGIS to visualize Pegel stations with their water level measurements.

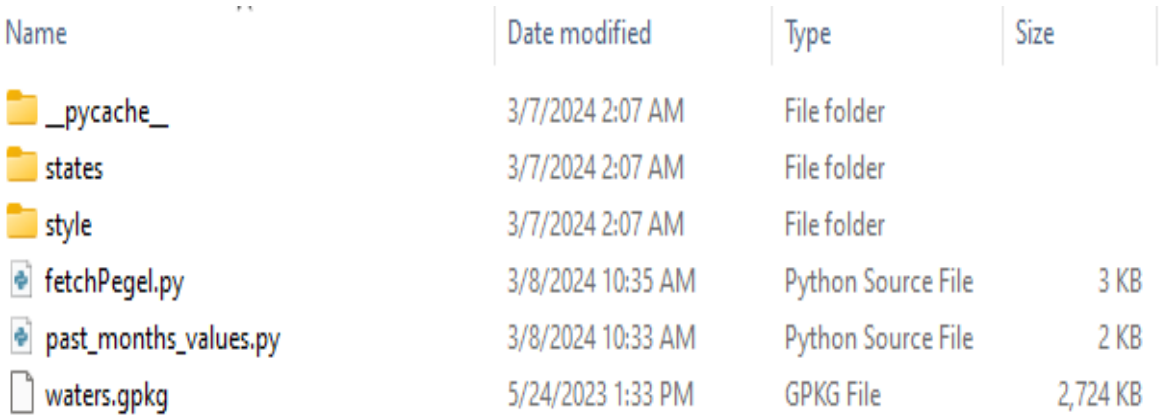
Technical description

In the plugin main folder, there are various files. Mainly, I used the "__init__.py" file to configure and design my plugin(Figure-1). Also, there is a module folder, which has layers, their styles and other python modules. These are used to fetch data from Pegel API(Figure-2) . These files are connected to plugin over "__init__.py" script.



__pycache__	3/7/2024 2:07 AM	File folder	
help	3/7/2024 2:07 AM	File folder	
i18n	3/7/2024 2:07 AM	File folder	
module	3/7/2024 2:07 AM	File folder	
scripts	3/7/2024 2:07 AM	File folder	
test	3/7/2024 2:07 AM	File folder	
__init__.py	3/12/2024 12:27 AM	Python Source File	10 KB
Makefile	2/27/2024 11:06 AM	File	8 KB
metadata.txt	3/7/2024 1:59 AM	Textdokument	2 KB
pb_tool.cfg	2/27/2024 11:06 AM	Configuration Sou...	3 KB
pegel_icon.png	3/5/2024 12:06 AM	PNG File	23 KB
pegel_plugin.py	3/5/2024 12:15 AM	Python Source File	7 KB
pegel_plugin_dialog.py	2/27/2024 11:06 AM	Python Source File	2 KB
pegel_plugin_dialog_base.ui	2/27/2024 3:33 PM	UI File	2 KB
plugin_upload.py	2/7/2024 11:43 AM	Python Source File	4 KB
pylintrc	2/7/2024 11:43 AM	File	9 KB
README.html	2/27/2024 11:06 AM	Microsoft Edge H...	2 KB
README.txt	3/7/2024 1:58 AM	Textdokument	1 KB
resources.py	2/27/2024 11:06 AM	Python Source File	6 KB
resources.qrc	2/27/2024 11:06 AM	QRC File	1 KB

Figure-1 Local Folder



Name	Date modified	Type	Size
__pycache__	3/7/2024 2:07 AM	File folder	
states	3/7/2024 2:07 AM	File folder	
style	3/7/2024 2:07 AM	File folder	
fetchPegel.py	3/8/2024 10:35 AM	Python Source File	3 KB
past_months_values.py	3/8/2024 10:33 AM	Python Source File	2 KB
waters.gpkg	5/24/2023 1:33 PM	GPKG File	2,724 KB

Figure-2 Module Folder

When we run the plugin, a message appears on the screen. I primarily structured my plugin using the ‘Minimal Plugin’ template. At the final version of my plugin, the icon of the plugin (Figure-3) and the user interface is attached in the following image(Figure-4).

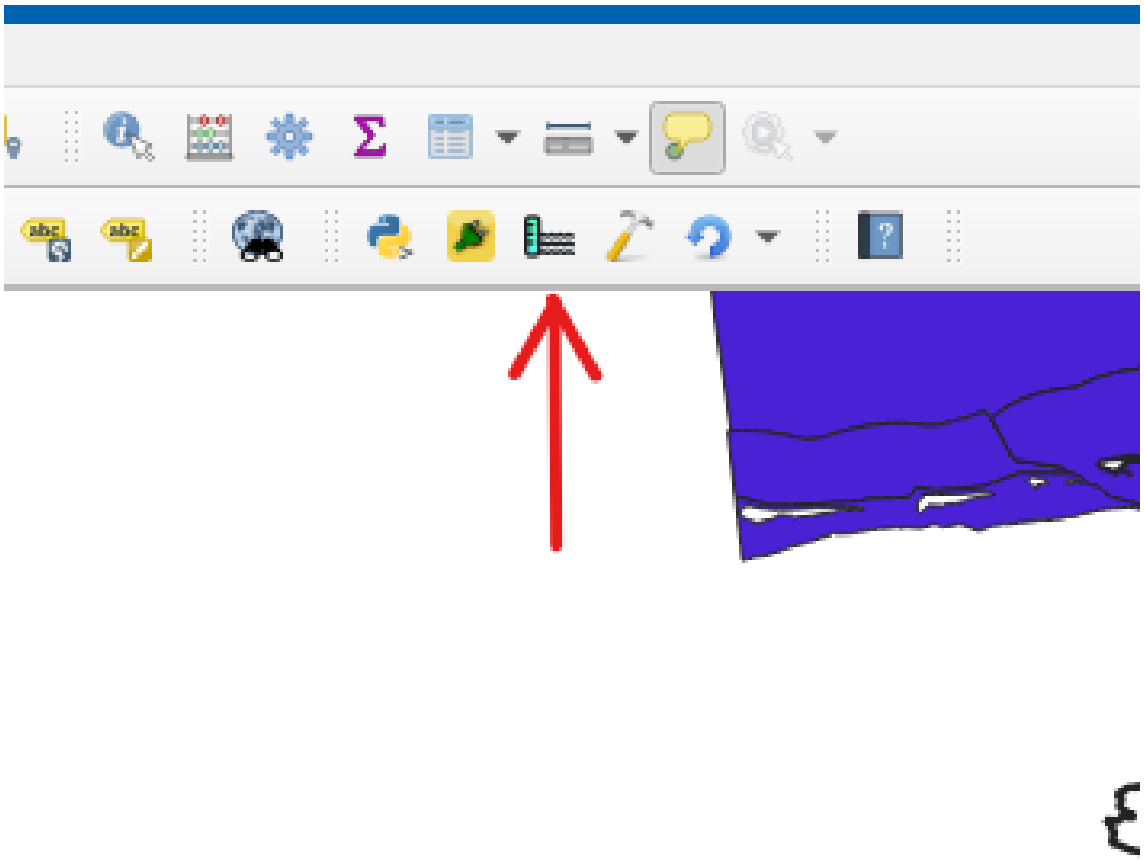


Figure-3 Pegel Icon

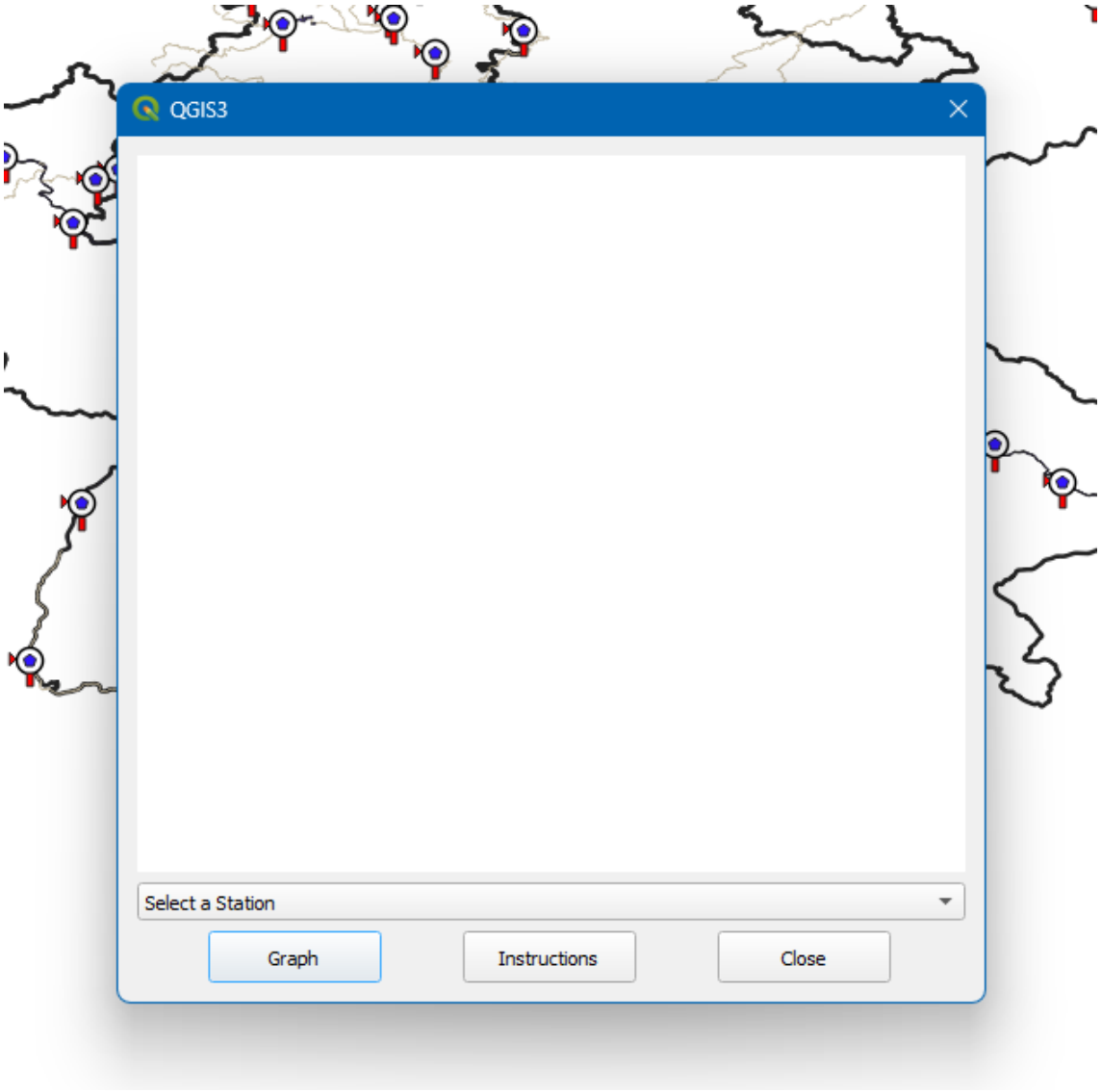


Figure-4: Pegel Plugin User Interface

There are three layouts are taking place on the plugin interface. At the top, the white area displays a graph. At the middle of the interface, there is a list containing names of Pegel stations. And lastly, buttons layout at the bottom of the plugin UI.

User Manual

This plugin is designed to display pegel stations and their last measurements. When clicking the icon, four layers appear on the QGIS Layers. “PegelPoints”, “water_lines” and “water_polygons and “states” of Germany(Figure-5). Pegel stations and their attributes are imported as a point layer under “PegelPoints” layer(Figure-6).

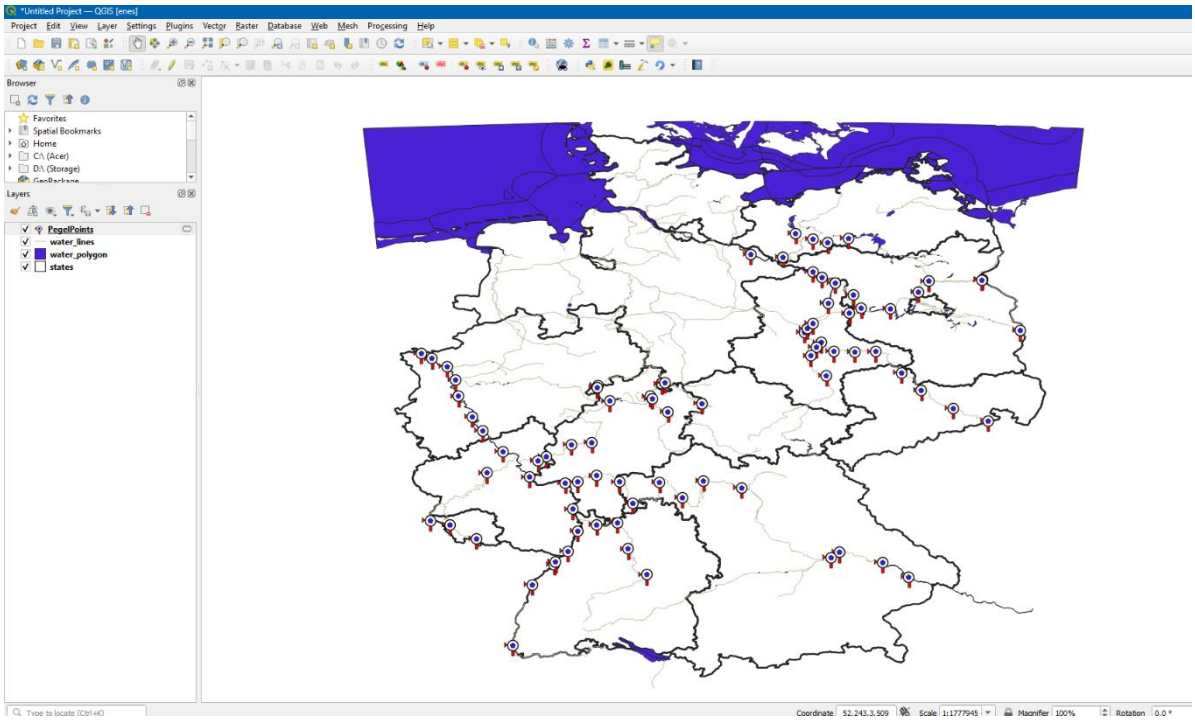


Figure-5 Pegel Plugin Layers

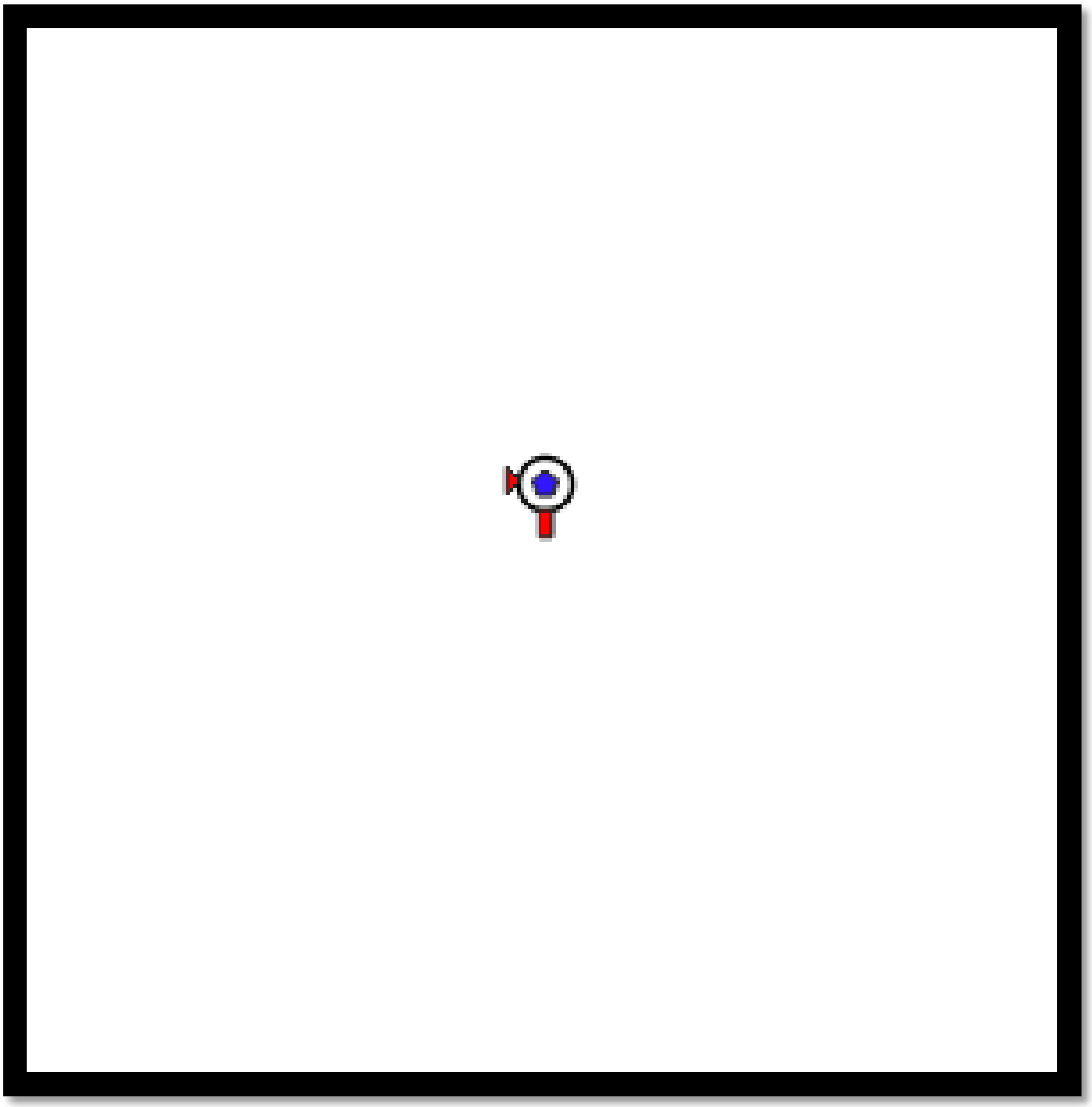
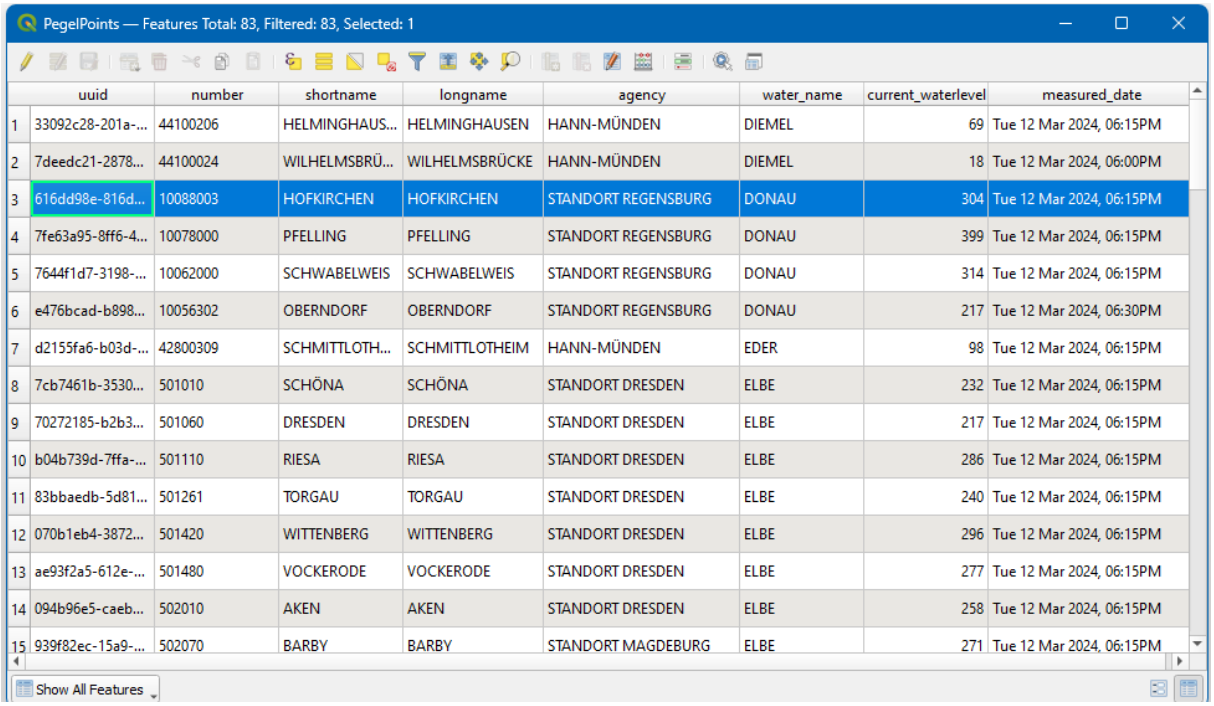


Figure-6 Pegel Point Icon

At the attribute table of stations, there are 8 features that can be observed: “uuid”, “number”, ”shortname”, ”longname”, ”agency”, ”water_name”, ”current_waterlevel” and “measured_date”.



	uuid	number	shortname	longname	agency	water_name	current_waterlevel	measured_date
1	33092c28-201a-...	44100206	HELMINGHAUS...	HELMINGHAUSEN	HANN-MÜNDEN	DIEMEL	69	Tue 12 Mar 2024, 06:15PM
2	7deedc21-2878...	44100024	WILHELMSBRÜ...	WILHELMSBRÜCKE	HANN-MÜNDEN	DIEMEL	18	Tue 12 Mar 2024, 06:00PM
3	616dd98e-816d...	10088003	HOFKIRCHEN	HOFKIRCHEN	STANDORT REGENSBURG	DONAU	304	Tue 12 Mar 2024, 06:15PM
4	7fe63a95-8ff6-4...	10078000	PFELLING	PFELLING	STANDORT REGENSBURG	DONAU	399	Tue 12 Mar 2024, 06:15PM
5	7644f1d7-3198-...	10062000	SCHWABELWEIS	SCHWABELWEIS	STANDORT REGENSBURG	DONAU	314	Tue 12 Mar 2024, 06:15PM
6	e476bcad-b898...	10056302	OBERNDORF	OBERNDORF	STANDORT REGENSBURG	DONAU	217	Tue 12 Mar 2024, 06:30PM
7	d2155fa6-b03d-...	42800309	SCHMITTLOTH...	SCHMITTLOTHEIM	HANN-MÜNDEN	EDER	98	Tue 12 Mar 2024, 06:15PM
8	7cb7461b-3530...	501010	SCHÖNA	SCHÖNA	STANDORT DRESDEN	ELBE	232	Tue 12 Mar 2024, 06:15PM
9	70272185-b2b3...	501060	DRESDEN	DRESDEN	STANDORT DRESDEN	ELBE	217	Tue 12 Mar 2024, 06:15PM
10	b04b739d-7ffa-...	501110	RIESA	RIESA	STANDORT DRESDEN	ELBE	286	Tue 12 Mar 2024, 06:15PM
11	83bbaedb-5d81...	501261	TORGAU	TORGAU	STANDORT DRESDEN	ELBE	240	Tue 12 Mar 2024, 06:15PM
12	070b1eb4-3872...	501420	WITTENBERG	WITTENBERG	STANDORT DRESDEN	ELBE	296	Tue 12 Mar 2024, 06:15PM
13	ae93f2a5-612e-...	501480	VOCKERODE	VOCKERODE	STANDORT DRESDEN	ELBE	277	Tue 12 Mar 2024, 06:15PM
14	094b96e5-caeb...	502010	AKEN	AKEN	STANDORT DRESDEN	ELBE	258	Tue 12 Mar 2024, 06:15PM
15	939f82ec-15a9-...	502070	BARBY	BARBY	STANDORT MAGDEBURG	ELBE	271	Tue 12 Mar 2024, 06:15PM

Figure-7: Attribute Table

When hovering any points, also a tooltip can be seen with station name, measurement value and date of measurement(Figure-8).

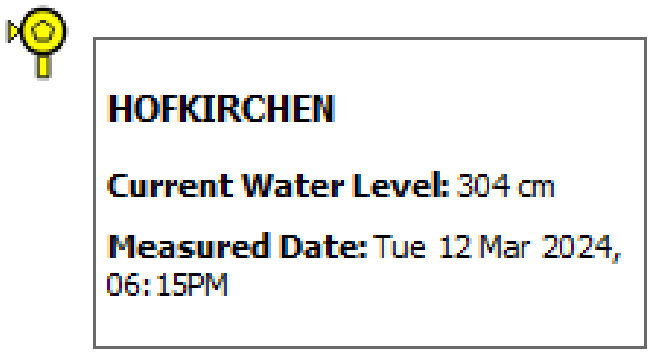


Figure-7 The Tooltip When Hovering Pegel station points

Turning back to plugin GUI, user can select the list of stations. Station names can be found just between the graph canvas and buttons. As any station is selected and clicking the “Graph” button the graph will appear at the top of the interface. This graph shows the past 30 days of measured water level values. In addition, the map will be also zoomed to given point(Figure-9)

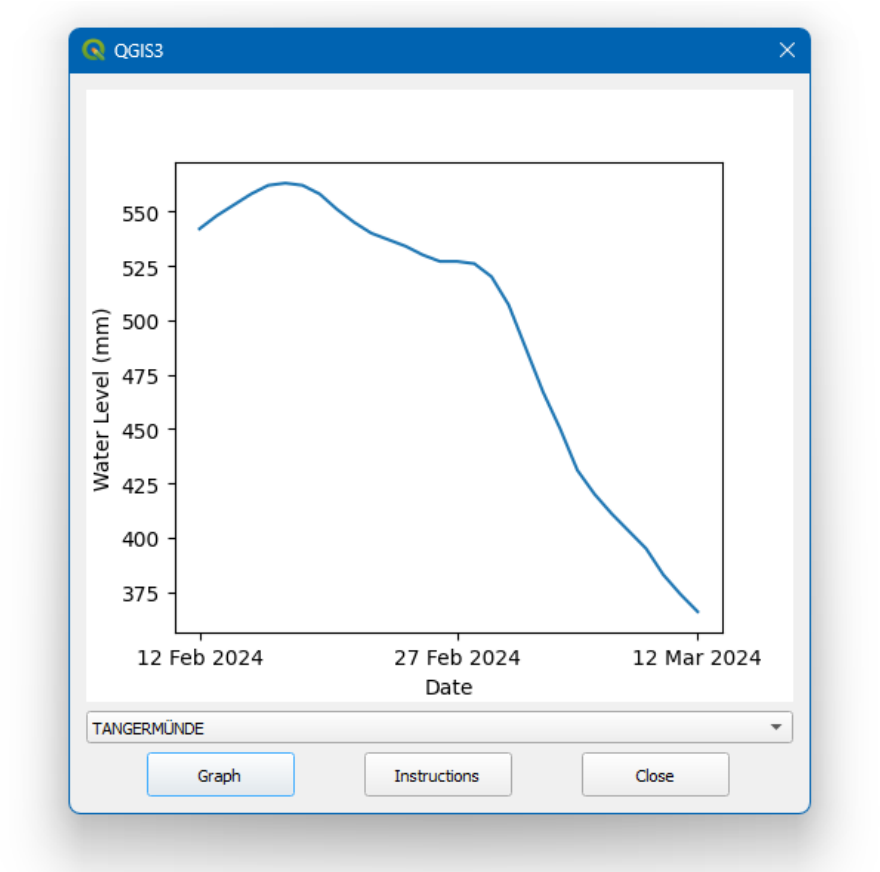


Figure-8 Graph of 30 days Values

There is also an “Instructions” button. Clicking this button leads to a new panel which simply explains to user the plugin how to use(Figure-10).

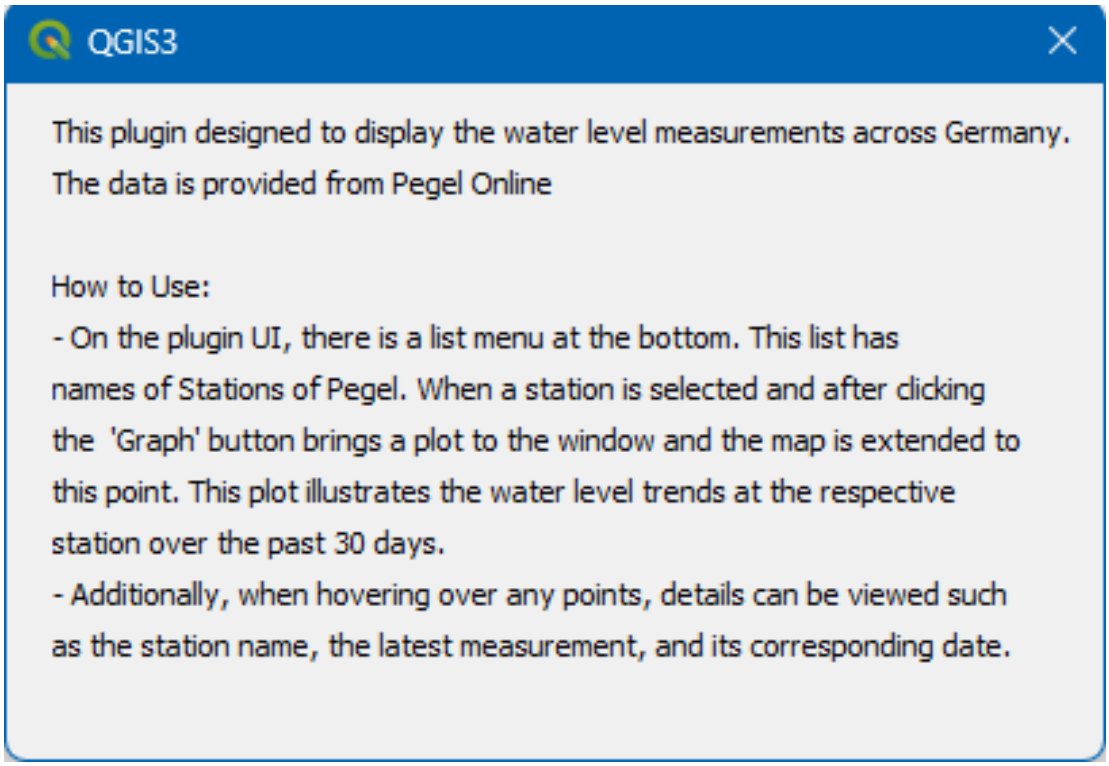


Figure-9 Instruction UI

Lastly, the “Close” button, the plugin interface will close.

Self-Assessment and Reflection

In this project, I reflected on my learning outcomes. I successfully learned how to utilize Python for QGIS plugin development and gained valuable experience in Python coding for GIS analysis and plugin creation. However, the last version of the plugin turned out to be quite simple and plain. Unfortunately, I spent a significant amount of time on QT Designer, which limited my ability to focus on improving the plugin. Nevertheless, I pushed myself to create a plugin from scratch rather than relying on ready-to-use scripts. To enhance clarity, I added comments wherever possible.

The Computer Programming for GIS course is one of my favorite courses, as it feels like I am studying Geoinformatics. While I hesitate to criticize this course, I did wish we could have more courses that focus on developing GIS programming skills and engaging in real-life projects.