


# Custom workflows in QGIS thanks to Python

a non technical introduction

Marco Bernasocchi

 @mbernasocchi  
marco@opengis.ch

**OPENGIS.ch**

MOBILE · QGIS · POSTGIS





@mbernasocchi

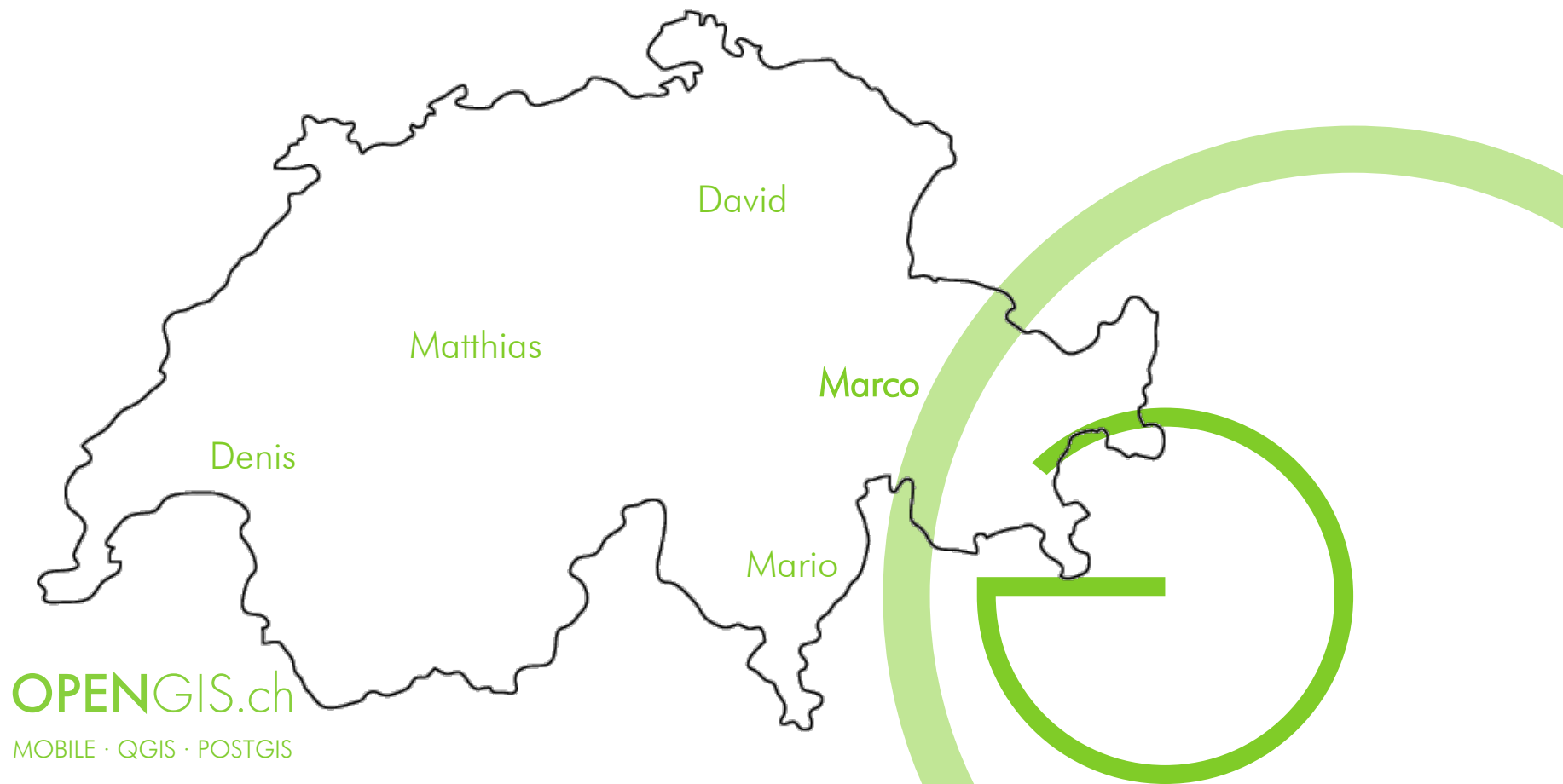
- QGIS Co-Chair
- QGIS on Android dad
- OPENGIS.ch CEO

**OPENGIS.ch**

MOBILE · QGIS · POSTGIS

# OPENGIS.ch LLC

Opensource geospatial experts at your doorsteps



# QGIS Evolution

- QGIS 0.0.1: 2002
- QGIS 1.0 "Kore": 2009
- QGIS 2.0 "Dufour": 2013
- QGIS 2.18 "Las Palmas": 2016 (October)
- QGIS 3.0 "Girona": 2018 (February)
- QGIS 3.4 "Madeira" (LTR version): 2018 (October)
- QGIS 3.8 "Zanzibar": 2019 (June)
- QGIS 3.10 "A Coruña (?)": 2019 (October) - LTR (2020 February)
- QGIS road map: <https://www.qgis.org/en/site/getinvolved/development/roadmap.html#release-schedule>



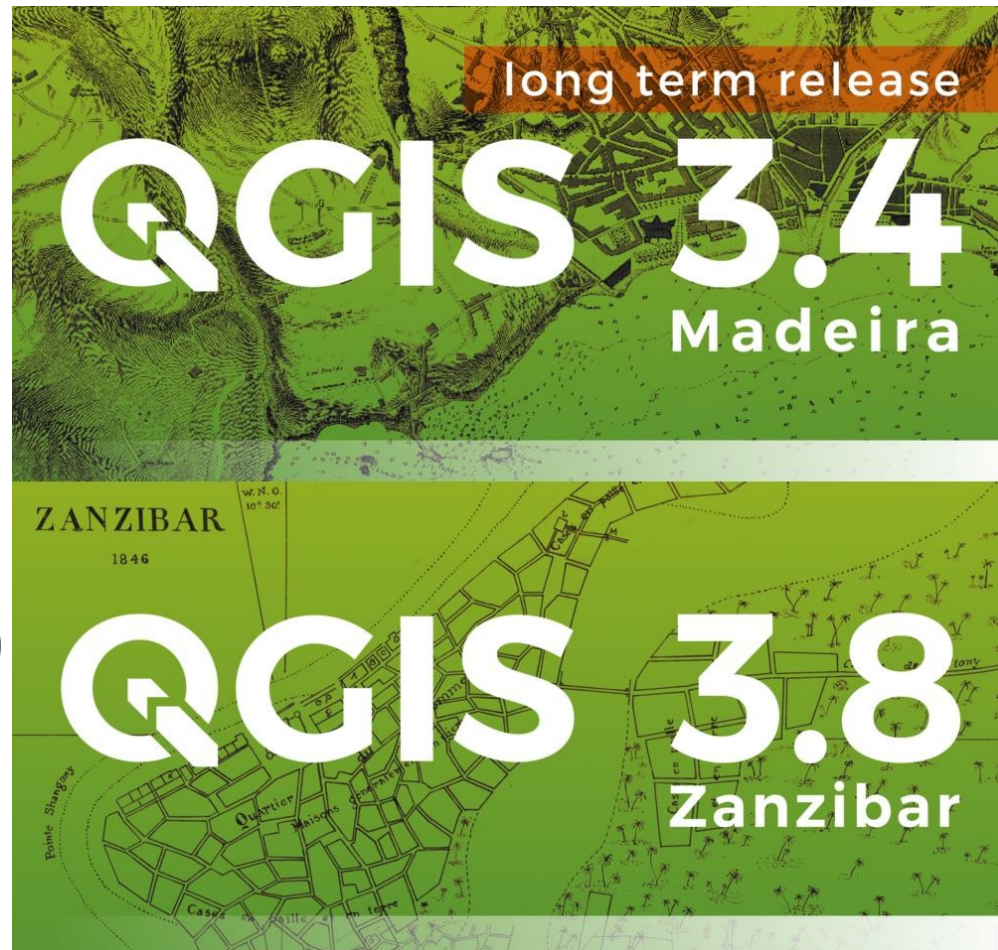
# Version 0.9 'Ganymede' (2007)

- Python bindings - This is the major focus of this release
  - It is now possible to create plugins using python. It is also possible to create GIS enabled applications written in python that use the QGIS libraries.
- Removed automake build system - QGIS now needs Cmake for compilation.
- Many new GRASS tools added
- Map Composer updates
- Crash fix for 2.5D shapefiles
- The QGIS libraries have been refactored and better organised.
- Improvements to the GeoReferencer



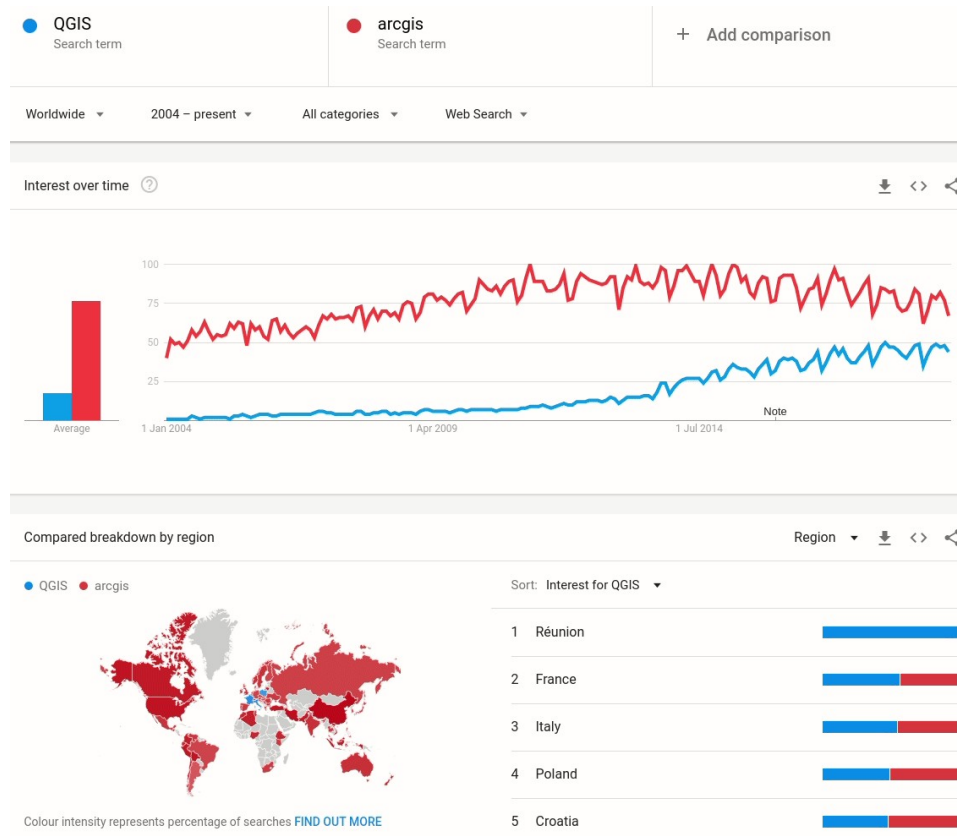
# 2.18 LTR → 3.4 LTR

- 2.18 End of life
  - No more releases
  - No more bugfixes
- 3.4.8 Current LTR
  - Time to upgrade
- 3.10.4 Next LTR (2.2020)



# QGIS vs ArcGIS

## 2004 - 2019



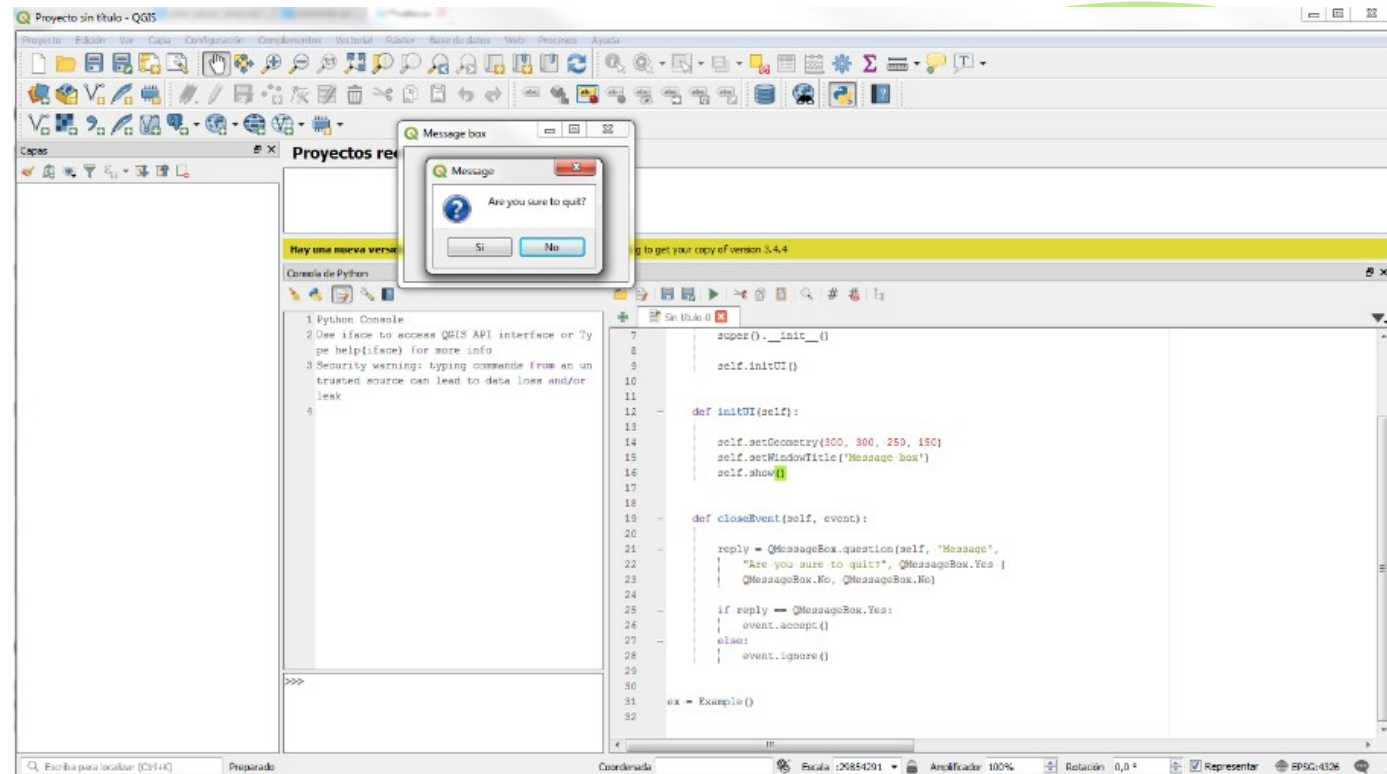
Google trends 12.06.19

OPENGIS.ch

MOBILE · QGIS · POSTGIS

# Python in QGIS

- Python 3 (all Plugins etc. must be upgraded)
- PyQt 5 support for GUI and more



Google trends 12.06.19



# PyQGIS API docs



**OPENGIS.ch** @OPENGISch · 1h

Public Service Announcement for Python Ninjas. The PyQGIS API documentation for QGIS 3.8 is online since right now [qgis.org/pyqgis/3.8/](https://qgis.org/pyqgis/3.8/)



5



16



**OPENGIS.ch**

MOBILE · QGIS · POSTGIS



# Python in QGIS - possibilities

- More granular control than with the UI
- Allows extending functionality
- Basically most of the things that can be done with the mouse, there are some exceptions where there is no Python API bindings (yet)

# Python in QGIS is everywhere

- Plugins
- Console
- Scripts
- Forms
- Macros
- Custom python expressions
- Custom apps



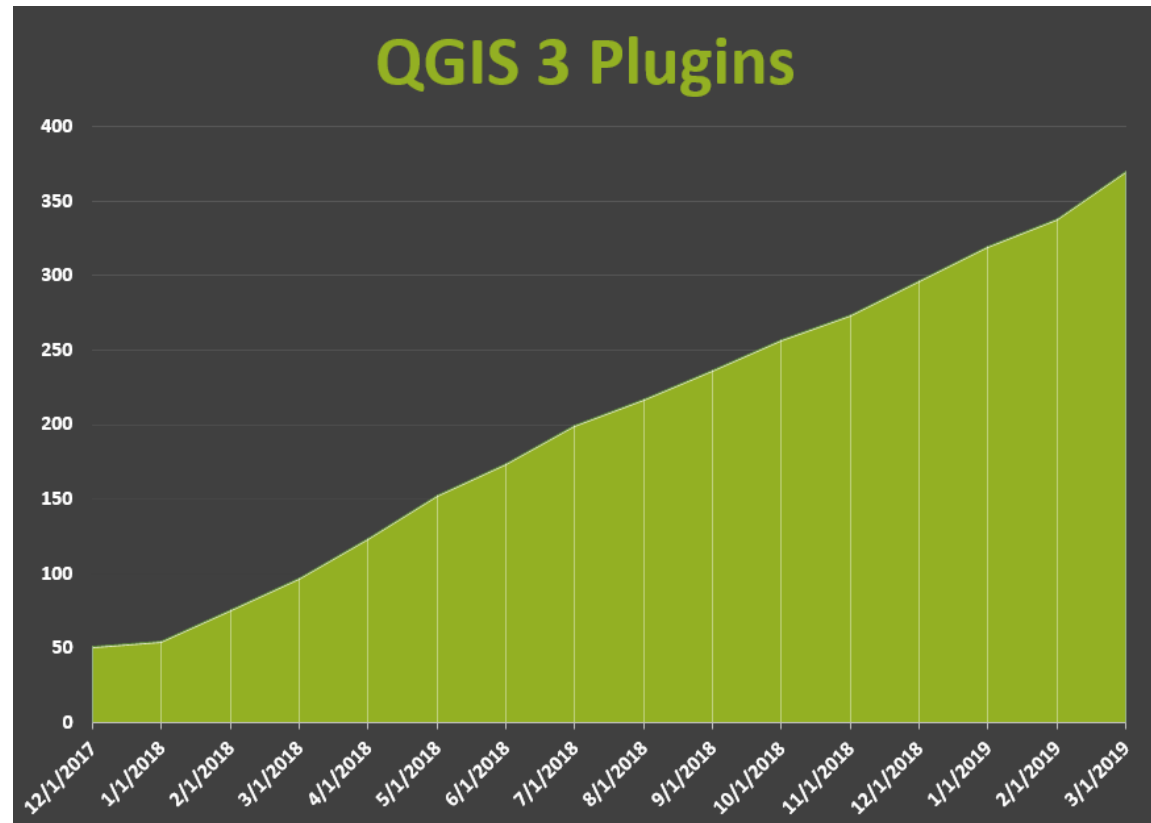
# plugins.qgis.org/plugins

- DataPlotly
- GroupStats
- Map Swipe Tool
- MMQGIS
- QGIS2ThreeJS
- QGIS2Web
- QuickMapServices
- QuickOSM
- Semi-Automatic Classification
- Sentinel Hub
- ShapeTools
- TauDEM
- Time Manager
- Whitebox
- QGIS Hats



OPENGIS.ch

MOBILE · QGIS · POSTGIS



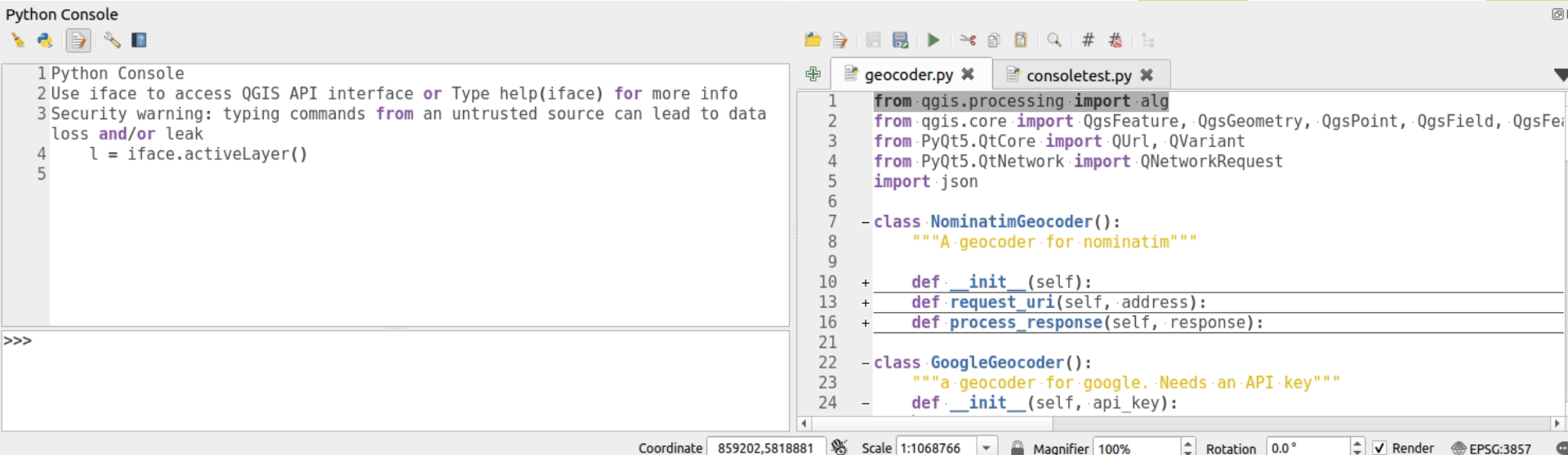
# Plugins

- Plugin builder
- Processing plugins



# Console

- Code completion, highlighting syntax and calltips for the certain APIs
- Execute code snippets from the output area
- Code editor
- Browse the command history
- Save and clear the command history. The history will be saved into a file
- Direct access to PyQGIS Cookbook



# Scripts

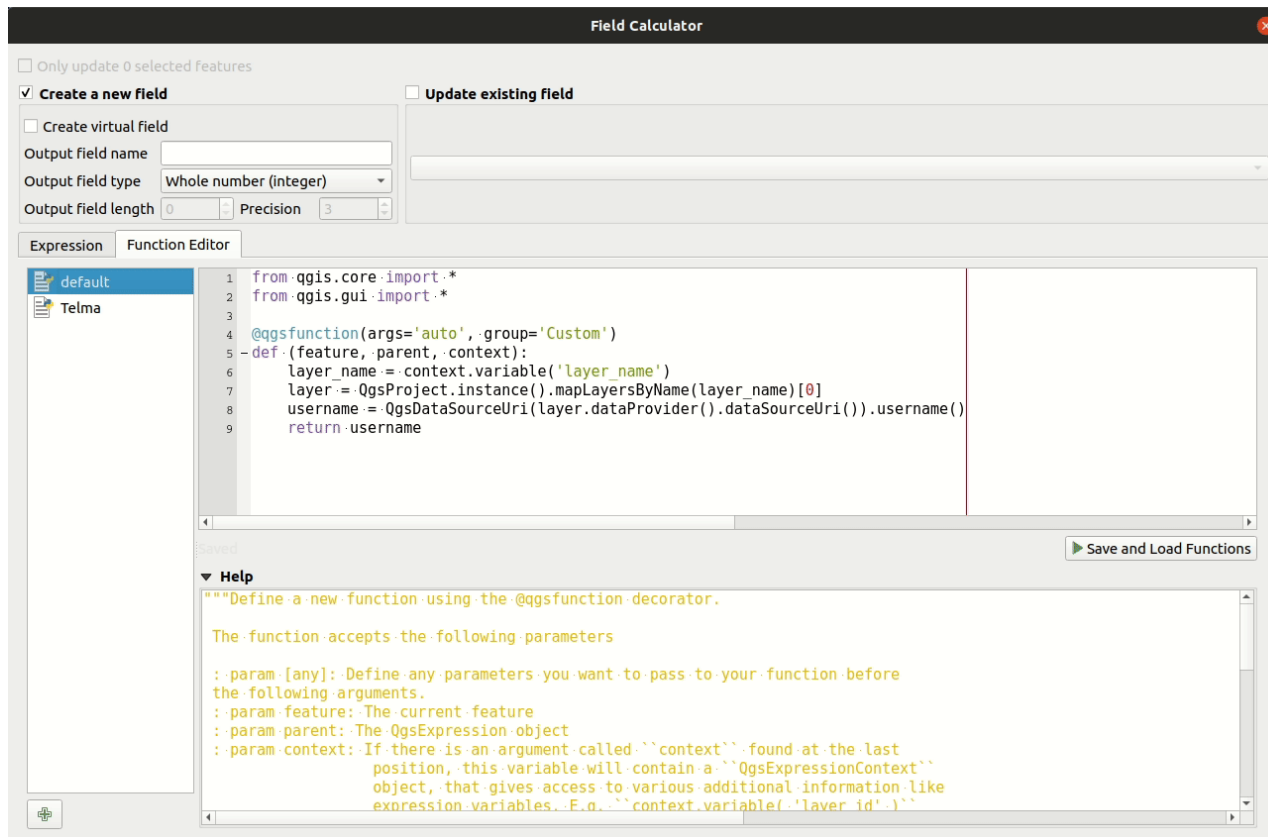
```
1 name, address, city
2 PostFinance-Filiale Zürich Rennweg, Rennweg 35, 8001 Zürich
3 PostFinance Affoltern am Albis, Bahnhofplatz 11, 8910 Affoltern am Albis
4 PostFinance Muri, Kirchenfeldstrasse 6, 5630 Muri AG
5 PostFinance-Filiale Dietikon, Neumattstrasse 22, 8953 Dietikon
6 PostFinance-Filiale Winterthur, Bahnhofplatz 8, 8400 Winterthur
7 PostFinance-Filiale Zug, Baarerstrasse 38, 6300 Zug
8 PostFinance-Filiale Horgen, Bahnhofstrasse 6, 8810 Horgen
9 PostFinance Bülach, Sonnenhof 1, 8180 Bülach
10 PostFinance Meilen, Dorfstrasse 73, 8706 Meilen
11 PostFinance Reinach AG, Postplatz 4, 5734 Reinach AG
12 PostFinance-Filiale Zürich Oerlikon, Edisonstrasse 3, 8050 Zürich
13 PostFinance-Filiale Uster, Bahnhofstrasse 9, 8610 Uster
14 PostFinance-Filiale Zürich Enge, Gutenbergstrasse 1, 8002 Zürich
15 PostFinance Kloten, Bahnhofstrasse 6, 8302 Kloten
16 PostFinance Küsnacht, Kohlrainstrasse 16, 8700 Küsnacht ZH
17 PostFinance-Filiale Baden, Nordhaus 3, 5400 Baden
18 PostFinance Würenlingen, Dorfstrasse 6, 5303 Würenlingen
19 PostFinance-Filiale Vevey, Avenue du Général-Guisan 17, 1800 Vevey
20 PostFinance Montreux, Avenue des Alpes 70, 1820 Montreux
21 PostFinance-Filiale Lausanne, Place Saint-François 15, 1003 Lausanne
22 PostFinance Aigle, Rue de la Gare 27, 1860 Aigle
23 PostFinance Bussigny, Route de Renens 1, 1030 Bussigny
24 PostFinance Monthey, Rue de Venise 3B, 1870 Monthey
25 PostFinance Morges, Grand-Rue 73, 1110 Morges
26 PostFinance-Filiale Sitten, Place de la Gare 7, 1950 Sion
27 PostFinance Martigny, Avenue de la Gare 34, 1920 Martigny
28 PostFinance Zweisimmen, Montreuxstrasse 5, 3770 Zweisimmen
29 PostFinance Sierre, Avenue Général-Guisan 2, 3960 Sierre
30 PostFinance Glarus, Schweizerhofstrasse 8, 8750 Glarus
31 PostFinance Ilanz, Via S. Clau Sura 11, 7130 Ilanz
32 PostFinance Wattwil, Grüenastrasse 4, 9630 Wattwil
33 PostFinance Amriswil, Kirchstrasse 18, 8580 Amriswil
34 PostFinance Kreuzlingen, Löwenstrasse 16, 8280 Kreuzlingen
35 PostFinance Pfäffikon ZH, Kempttalstrasse 26, 8330 Pfäffikon ZH
36 PostFinance-Filiale Wil, Lerchenfeldstrasse 10, 9500 Wil SG
37 PostFinance Herisau, Gossauerstrasse 2, 9100 Herisau
38 PostFinance-Filiale Rapperswil, Untere Bahnhofstrasse 2, 8640 Rapperswil SG
39 PostFinance-Filiale Frauenfeld, Rheinstrasse 5, 8500 Frauenfeld
40 PostFinance Chêne-Bourg, Rue du Gothard 22, 1225 Chêne-Bourg
41 PostFinance-Filiale Genf Carouge, Rue des Allobroges 5, 1227 Carouge GE
42 PostFinance-Filiale Nyon, Place Bel-Air 5, 1260 Nyon
43 PostFinance-Filiale Genf Mont Blanc, Rue du Mont-Blanc 18, 1201 Genève
44 PostFinance Davos, Promenade 111, 7270 Davos Platz
45 PostFinance-Filiale Chur, Bahnhofplatz 3, 7000 Chur
46 PostFinance St. Moritz, Bahnhofplatz 3, 7000 Chur
47 PostFinance-Filiale Luzern, Bahnhofplatz 4, 6003 Luzern
48 PostFinance Stans, Stansstadterstrasse 90, 6370 Stans
49 PostFinance Seewen, Bahnhofstrasse 128, 6423 Seewen SZ
50 PostFinance Altdorf (Uri), Bahnhofstrasse 9, 6460 Altdorf UR
51 PostFinance Solothurn, Kronengasse 12, 4500 Solothurn
52 PostFinance-Filiale Biel, Bahnhofstrasse 49, 2502 Biel/Bienne
53 PostFinance Grenchen, Solothurnstrasse 32, 2540 Grenchen
54 PostFinance Laufen, Bahnhofstrasse 4, 4242 Laufen
55 PostFinance Tramelan, Grand-Rue 126, 2720 Tramelan
```

CSV ▾ Tab Width: 4 ▾ Ln 1, Col 1 ▾ INS

OPENGIS.ch

MOBILE · QGIS · POSTGIS

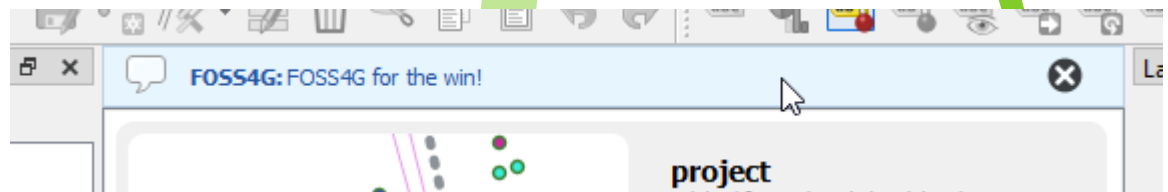
# Custom python expressions



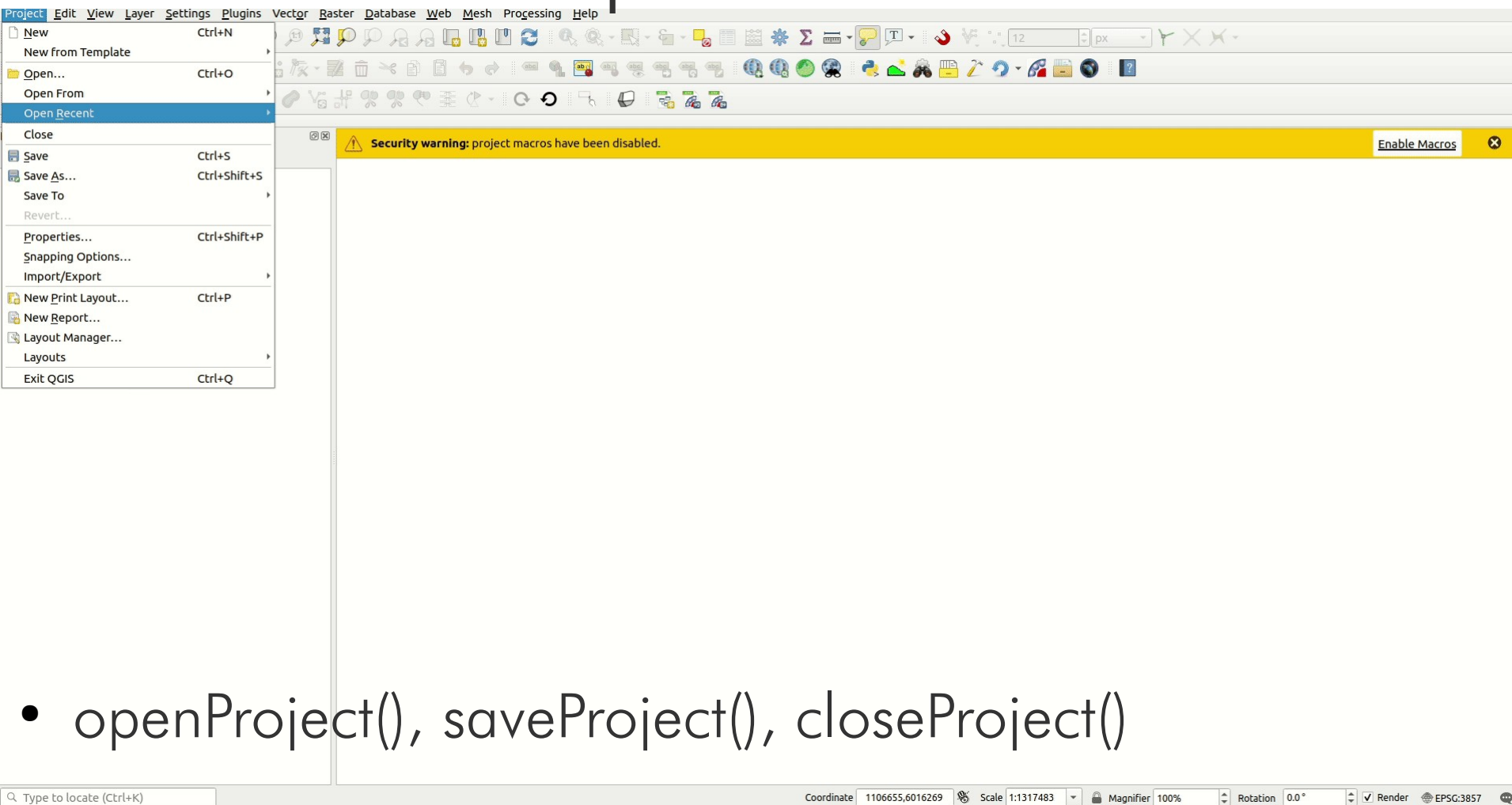


# Startup

- `--code` command line option
- `startup.py` in the root app data folder for QGIS
- `PYQGIS_STARTUP` environment variable
- *from qgis.utils import iface*  
*iface.messageBar().pushMessage("FOSS4G", "FOSS4G for the win!", duration=0)*



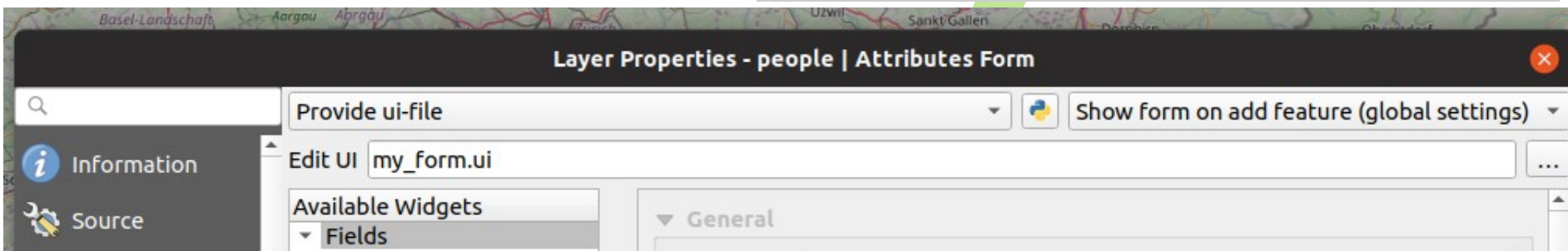
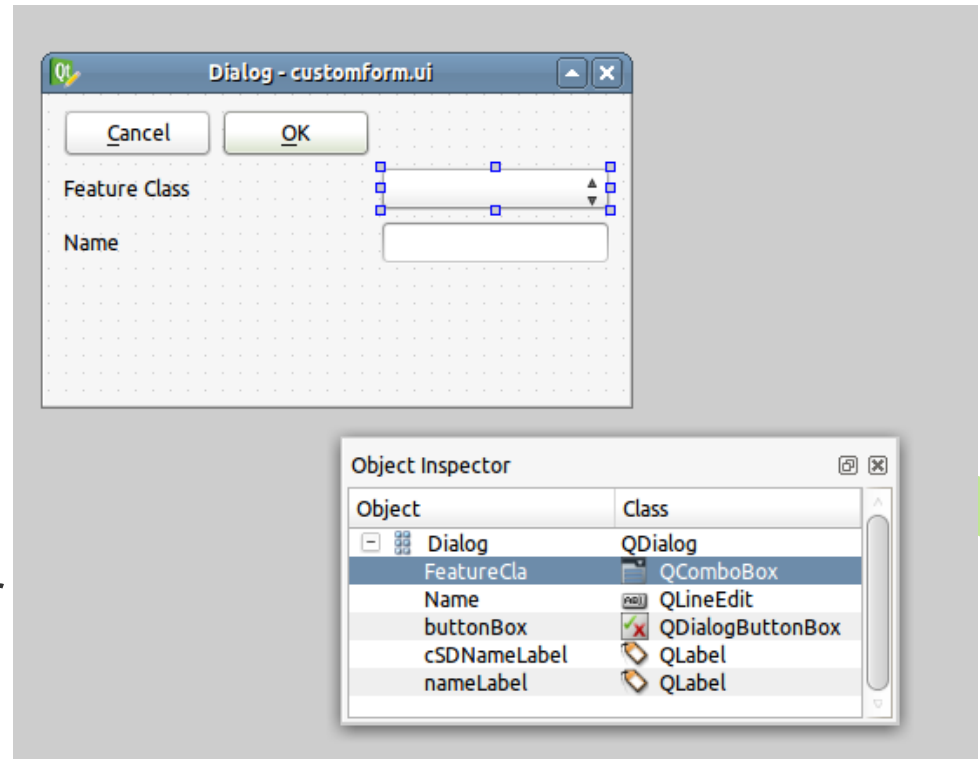
# Project macros



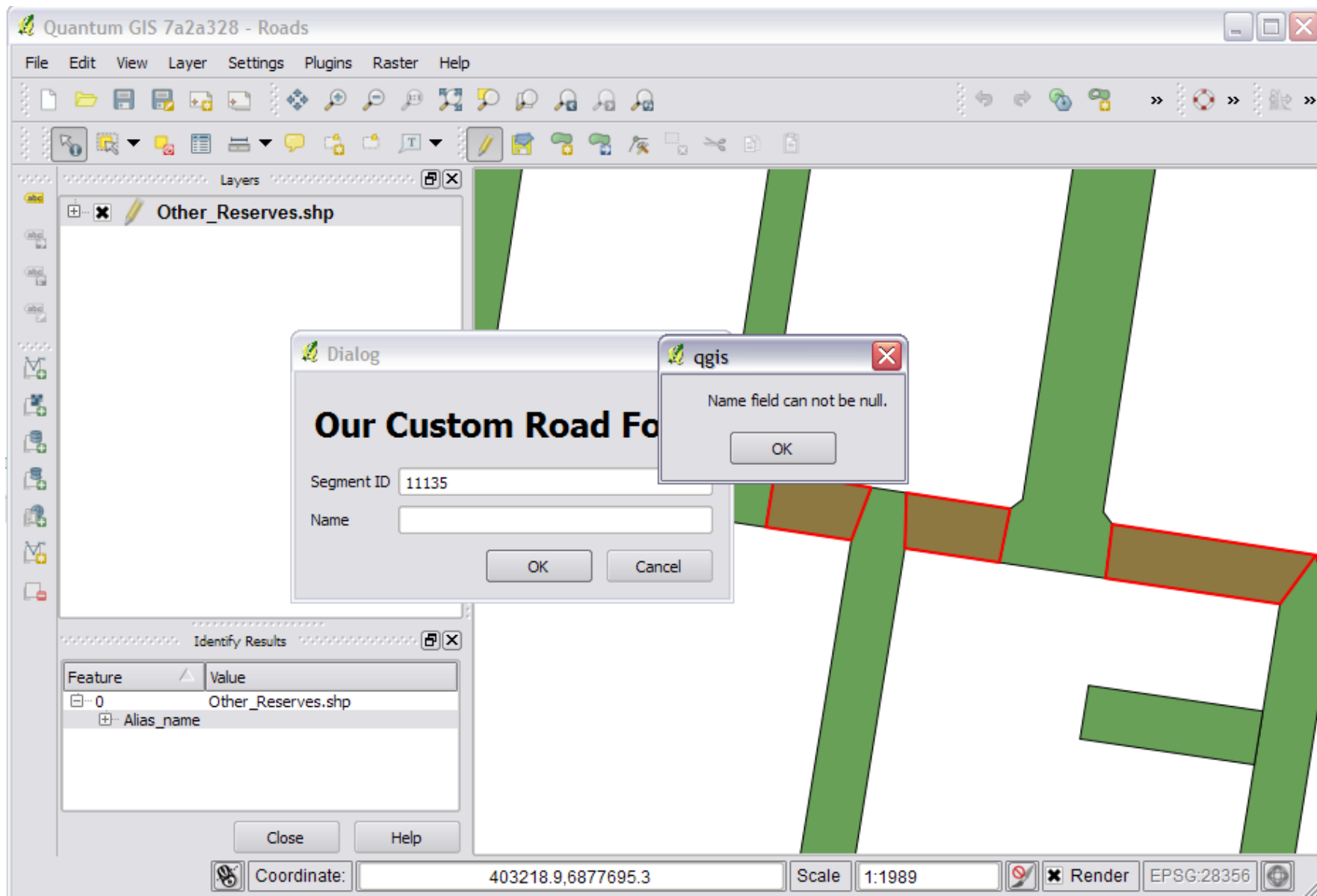
- `openProject()`, `saveProject()`, `closeProject()`

# Feature Forms

- create the form with the controls you need, remember to name them the same as your fields.



# Feature Forms



# Custom PyQGIS apps

```
from qgis.core import *

# Supply path to qgis install location
QgsApplication.setPrefixPath("/path/to/qgis/installation", True)

# Create a reference to the QgsApplication. Setting the
# second argument to False disables the GUI.
qgs = QgsApplication([], False)

# Load providers
qgs.initQgis()

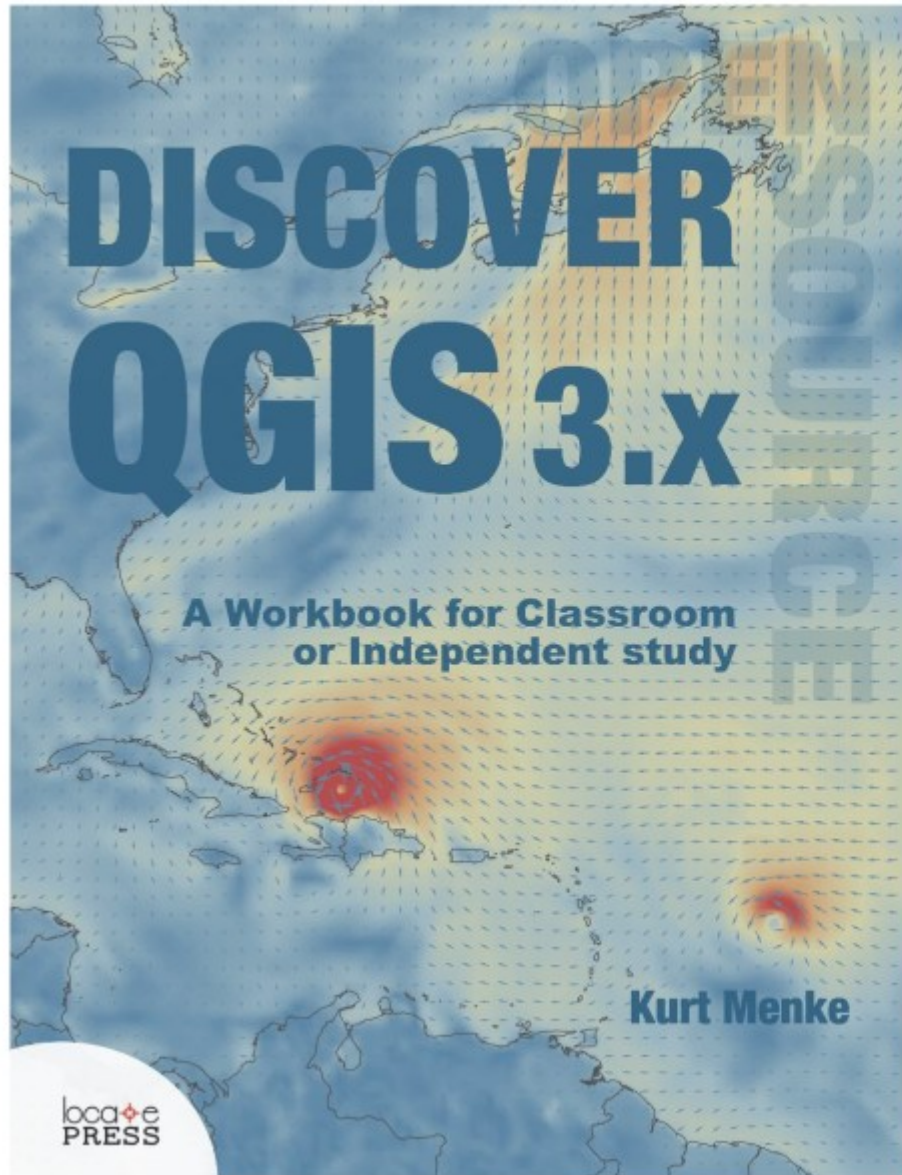
# Write your code here to load some layers, use processing
# algorithms, etc.

# Finally, exitQgis() is called to remove the
# provider and layer registries from memory

qgs.exitQgis()
```

# Shameless Plug #1

**Spring 2019**



- ✓ Updated for QGIS 3.6
  - ✓ A workbook for classroom or independent study
  - ✓ Lab exercises based on the GeoAcademy
  - ✓ Data, Discussion questions & Solution files included
  - ✓ Challenge exercises
  - ✓ Learn enhanced workflows with QGIS 3.x
  - ✓ Covers Spatial analysis, Data management & Cartography
  - ✓ New section → Advanced Data Visualization
    - Blending modes | Live layer effects | Expression-based symbology | Geometry generators | Time Manager | 3D | Mesh data
  - ✓ Available in Print and e-Book
  - ✓ 400 pages
  - ✓ \$35
- Appendices**
- Keyboard shortcuts
  - Useful plugins
  - Getting involved



**BIRD'S EYE  
VIEW GIS**

**locate  
PRESS**  
Open Source "Your" Books & Training

<https://locatepress.com/dq3>



# Shameless Plug #2



# Shameless Plug #3

# REDISCOVER





# Thanks! Questions?

A photograph showing four men in a brewery setting. They are gathered around a large, horizontal copper barrel, which is being tilted. The man on the far left is wearing a bright green jacket and a dark cap. The man next to him is wearing a brown sweater. The man in the center is wearing a dark hoodie. The man on the far right is wearing a grey sweater and glasses. They are all looking down at the barrel with interest. In the background, there are stone walls, wooden beams, and a sign that reads "WENGERT Brenner- und Bautechnik".

Get in touch  
@OPENGISch  
info@opengis.ch