QGIS plugins for groundwater monitoring and modelling

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International Groundwater Resources Assessment Centre

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QGIS User Group Meeting
IHE Delft

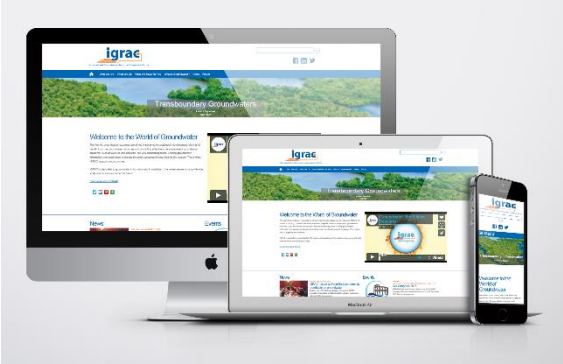
IGRAC - Global Groundwater Centre

IGRAC is a UNESCO and WMO groundwater centre

facilitates and promotes sharing groundwater information and knowledge required for sustainable groundwater management

Focusing on

- *transboundary aquifer assessment*
- *groundwater monitoring and*
- *information & knowledge management*



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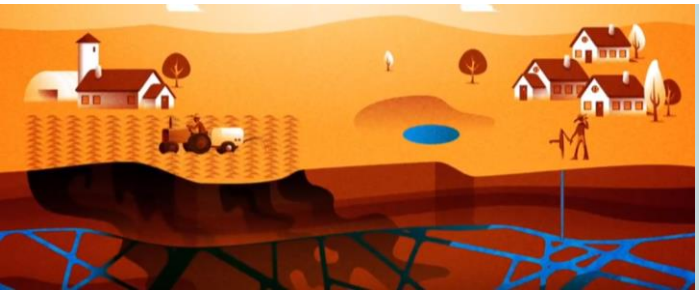
Overview

- The Global Groundwater Monitoring Network (GGMN)
- GGMN plugin for QGIS
- FREEWAT: QGIS plugin for groundwater modelling
- GGMN and FREEWAT integration



The Global Groundwater Monitoring Network (GGMN)

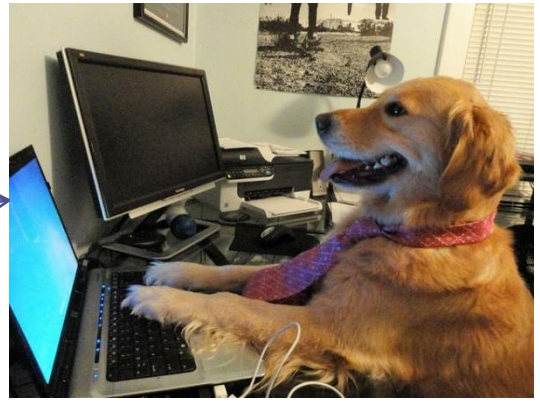
- Groundwater management decisions ← Availability of data
  - *Global lack of groundwater information*

Groundwater management

Regional studies on climate change

Adaptation measures

Hydro(geo)logical models



- Global Groundwater Monitoring Network (GGMN) Programme
  - *to improve accessibility and quality of groundwater monitoring information and hence the knowledge on the state of groundwater resources.*

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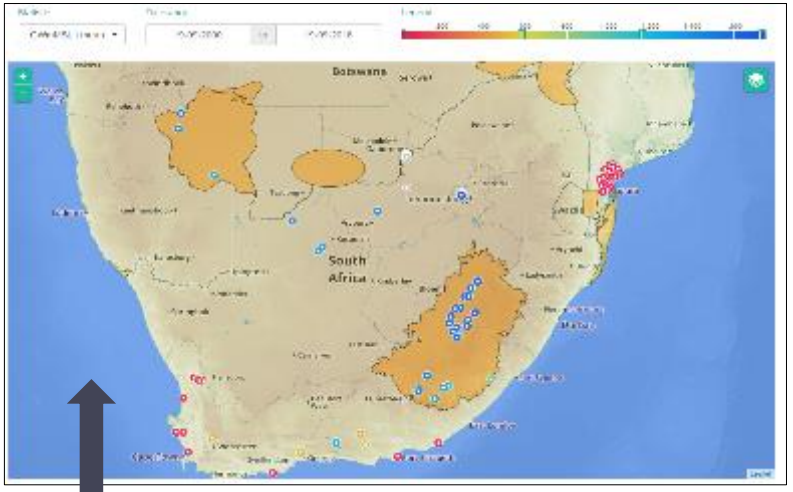
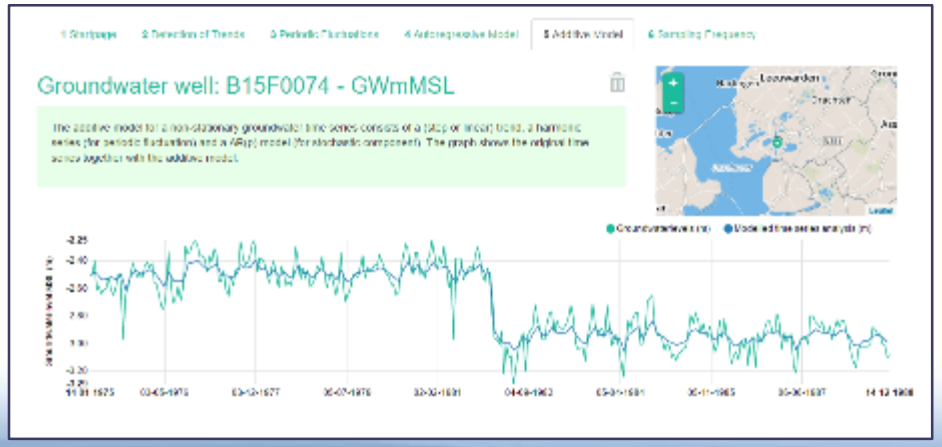
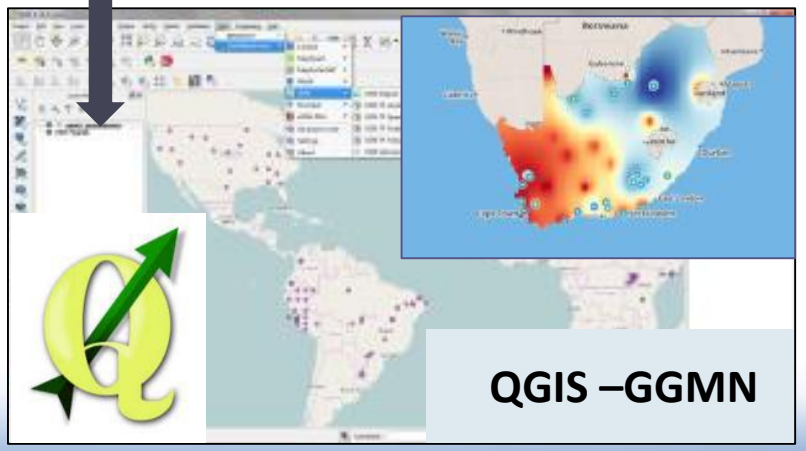
GGMN Portal functionalities

Global | Regional | Time series analysis | Organisation | Download | Import | Log in







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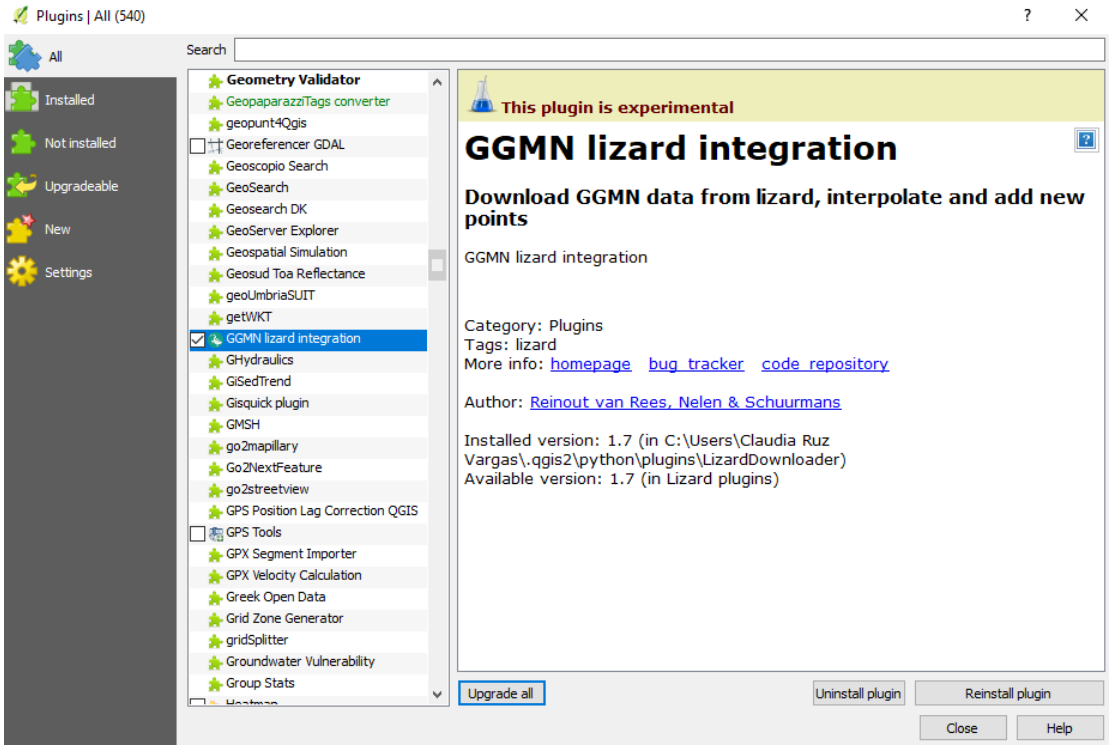
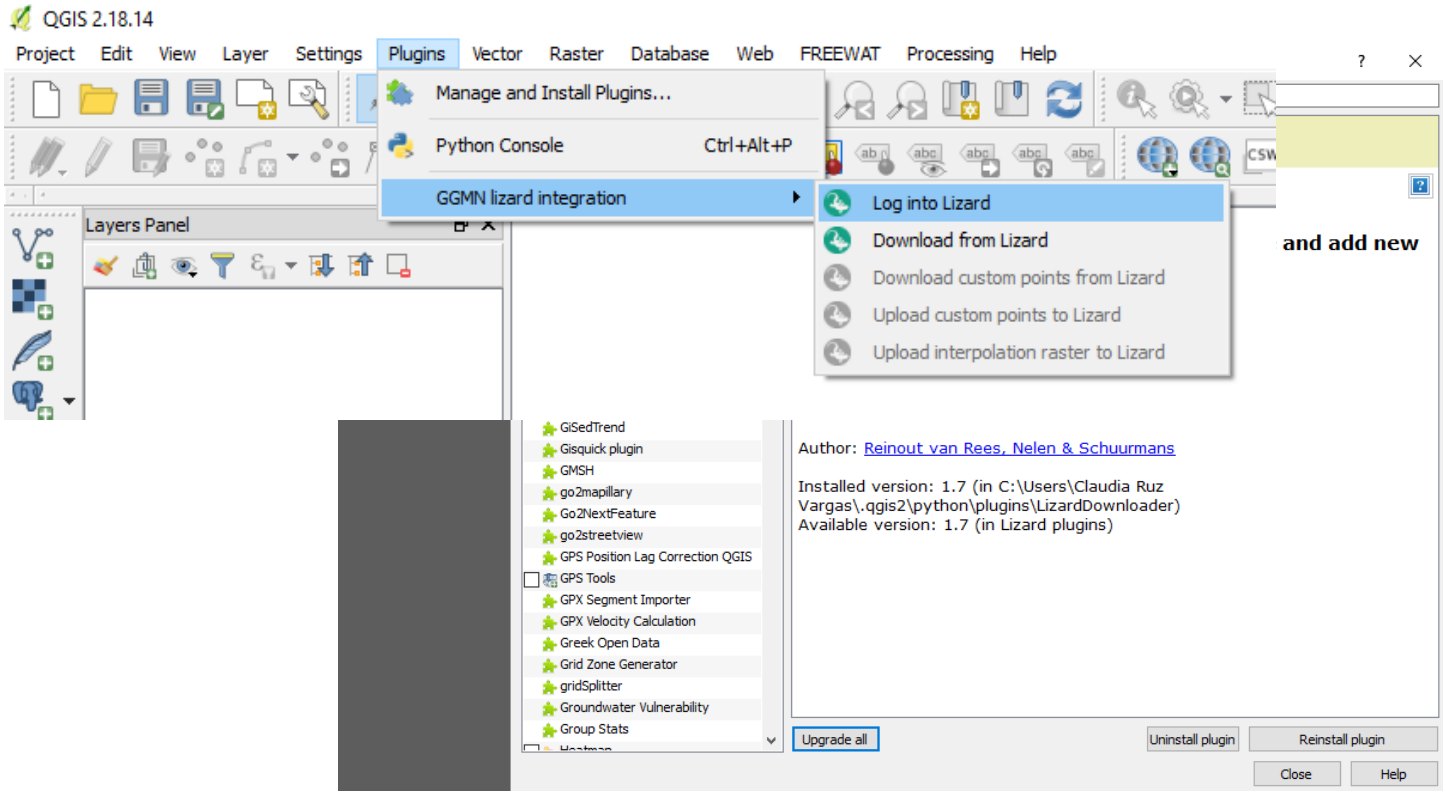
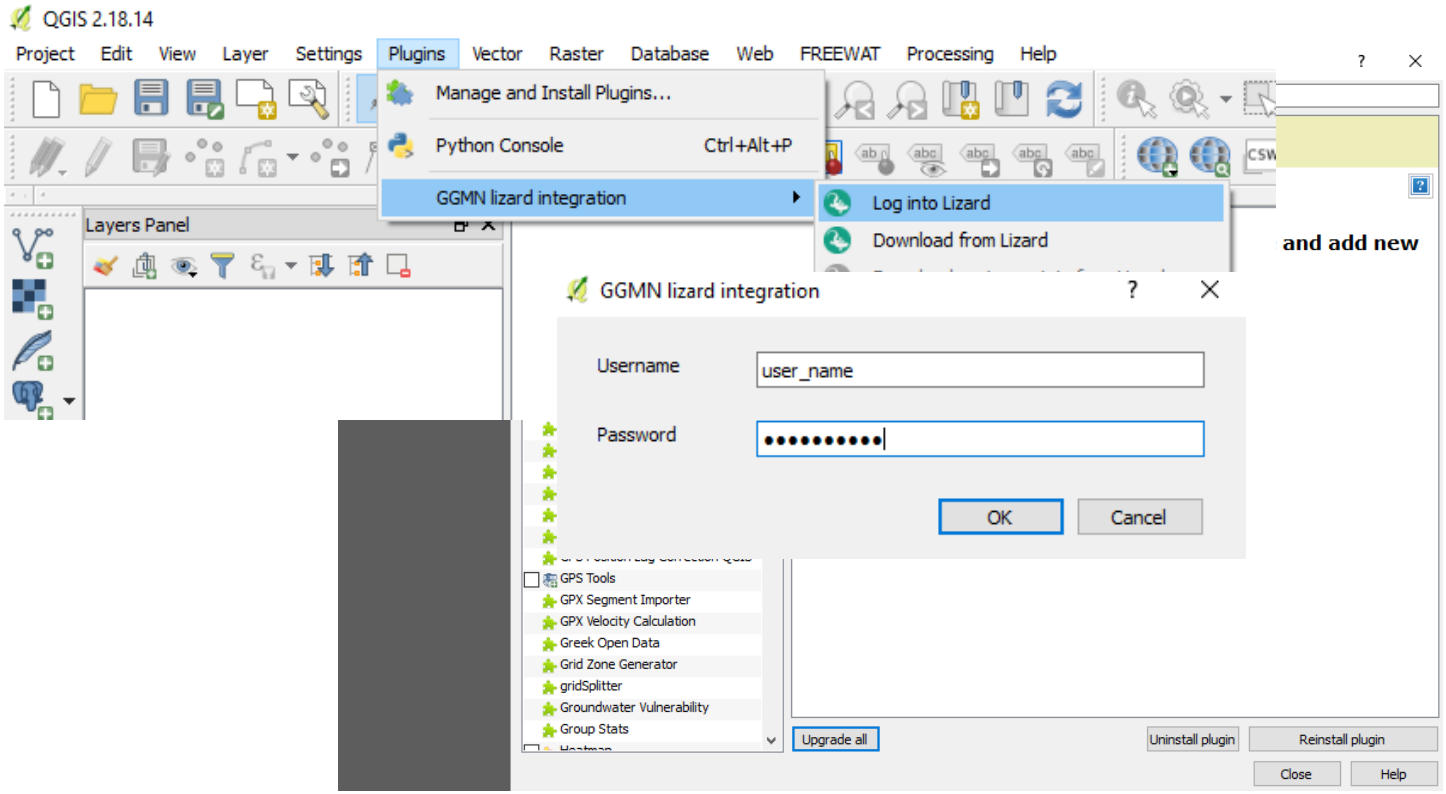
GGMN QGIS plugin



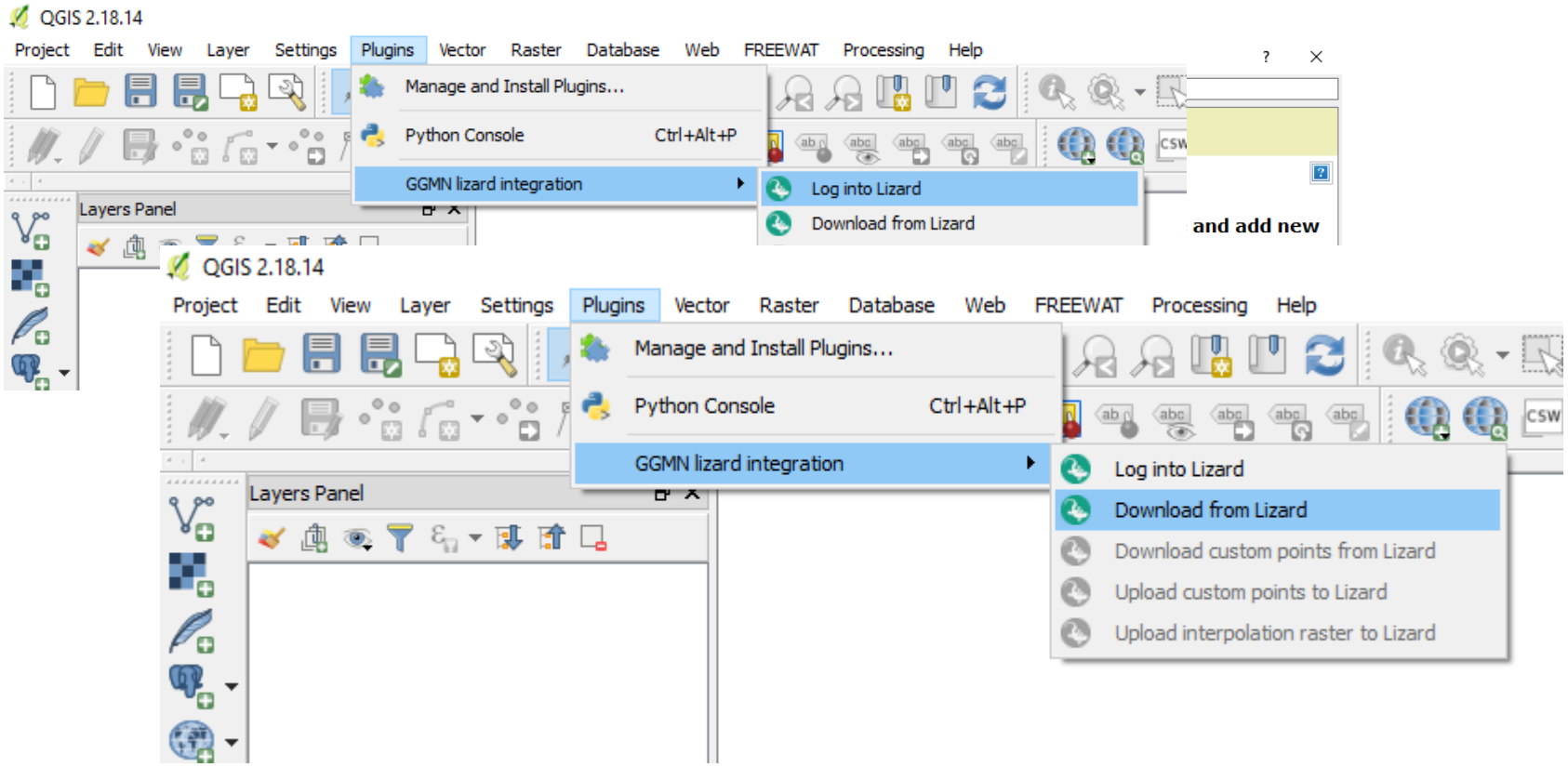
GGMN QGIS plugin



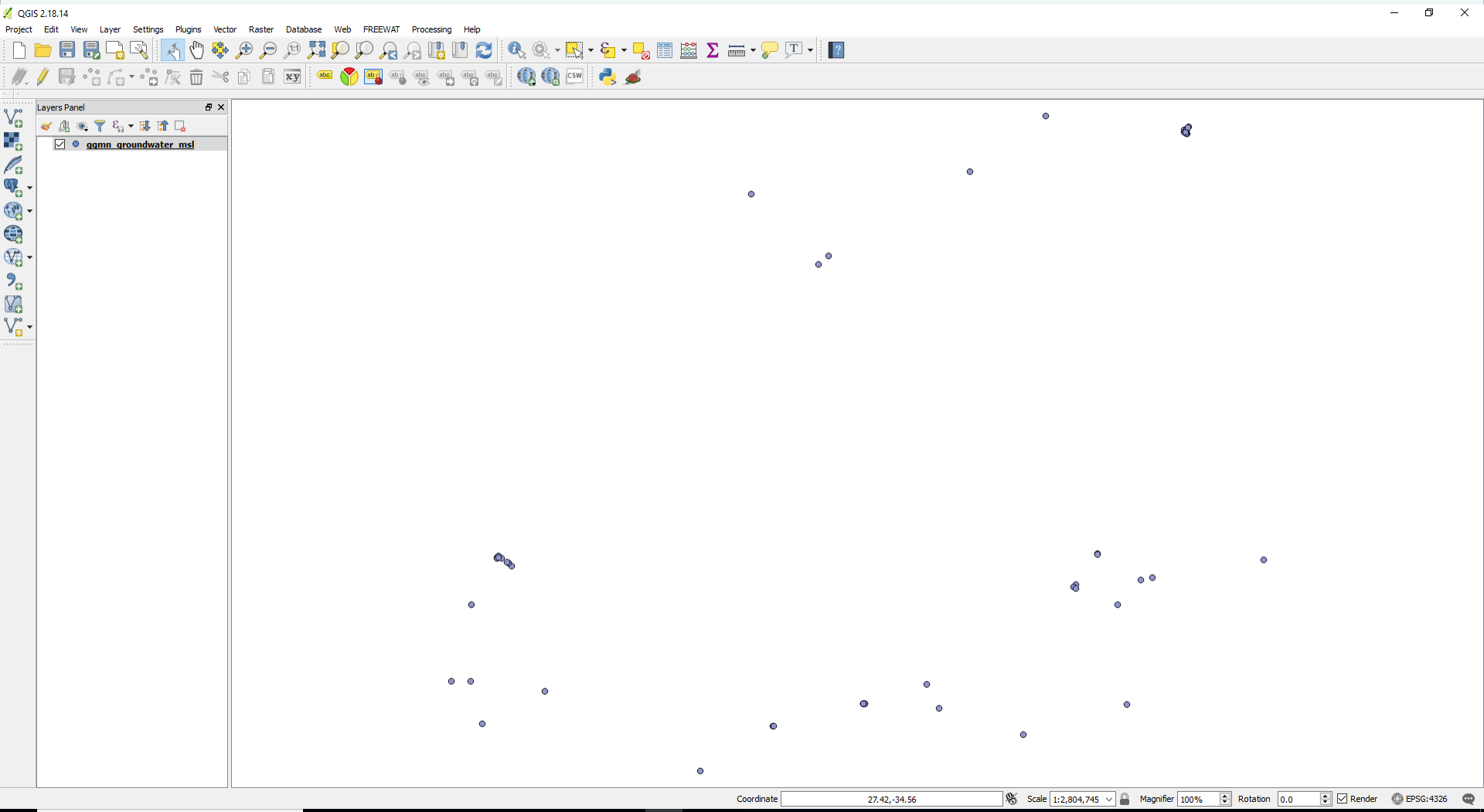
GGMN QGIS plugin



GGMN QGIS plugin



GGMN QGIS plugin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Layers Panel
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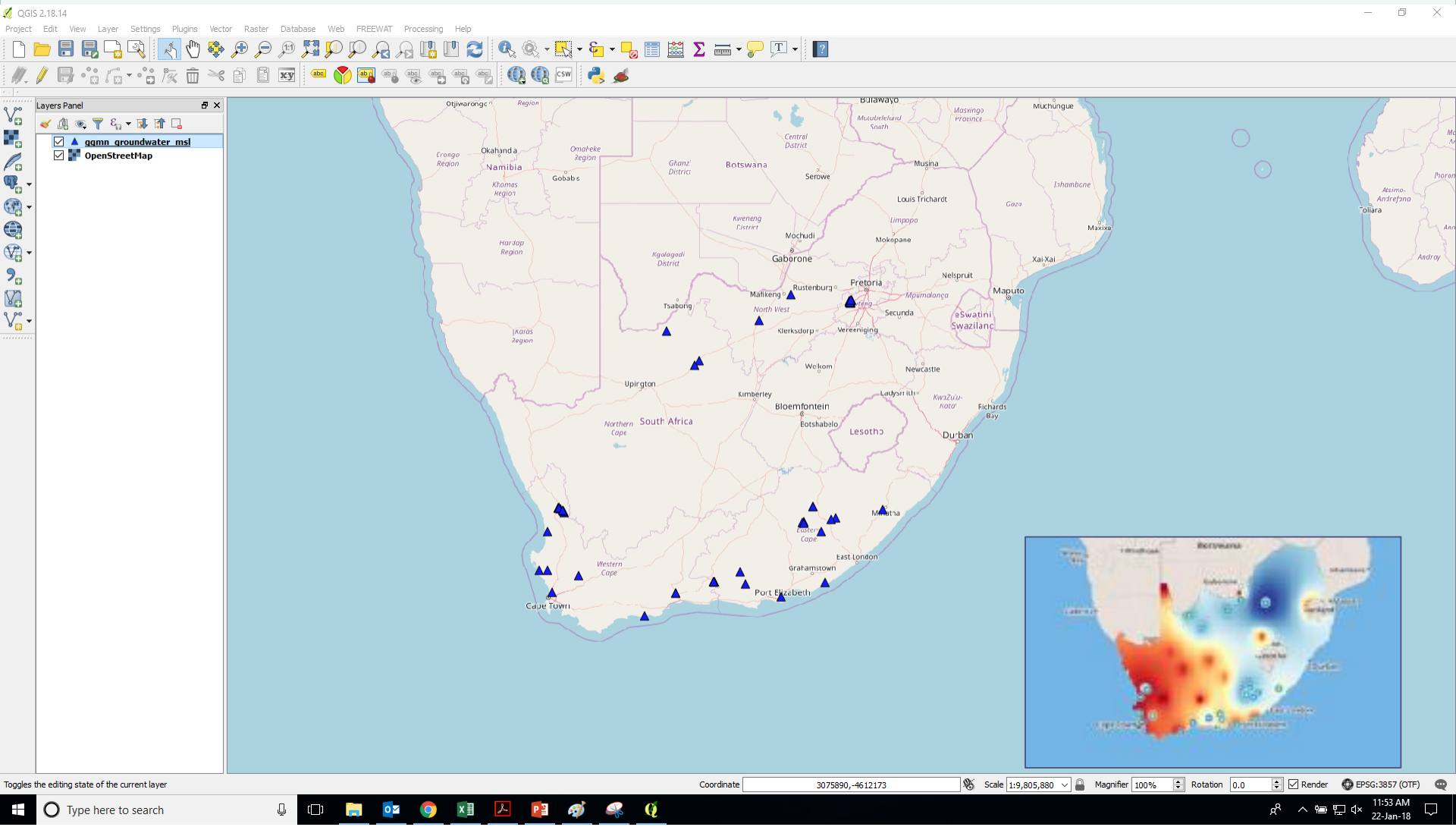
QGIS 2.18.14
Project Edit View Layer Settings Plugins Vector Raster Database Web FREEWAT Processing Help
Layers Panel
qgmn_groundwater_msl
OpenStreetMap
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Botswana
South Africa
Lesotho
eSwatini
Gaborone
Pretoria
Johannesburg
Maputo
Durban
Cape Town
Port Elizabeth
East London
Bloemfontein
Kimberley
Upington
Mafikeng
Rustenburg
Polokwane
Nelspruit
Newcastle
Welkom
Musina
Serowe
Mochudi
Tsabong
Gobabis
Okahandja
Otjiwarongo
Bulawayo
Francistown
Maxixe
Xai-Xai
Inhambane
Richards Bay
Grahamstown
Klerksdorp
Vereeniging
Secunda
Mokopane
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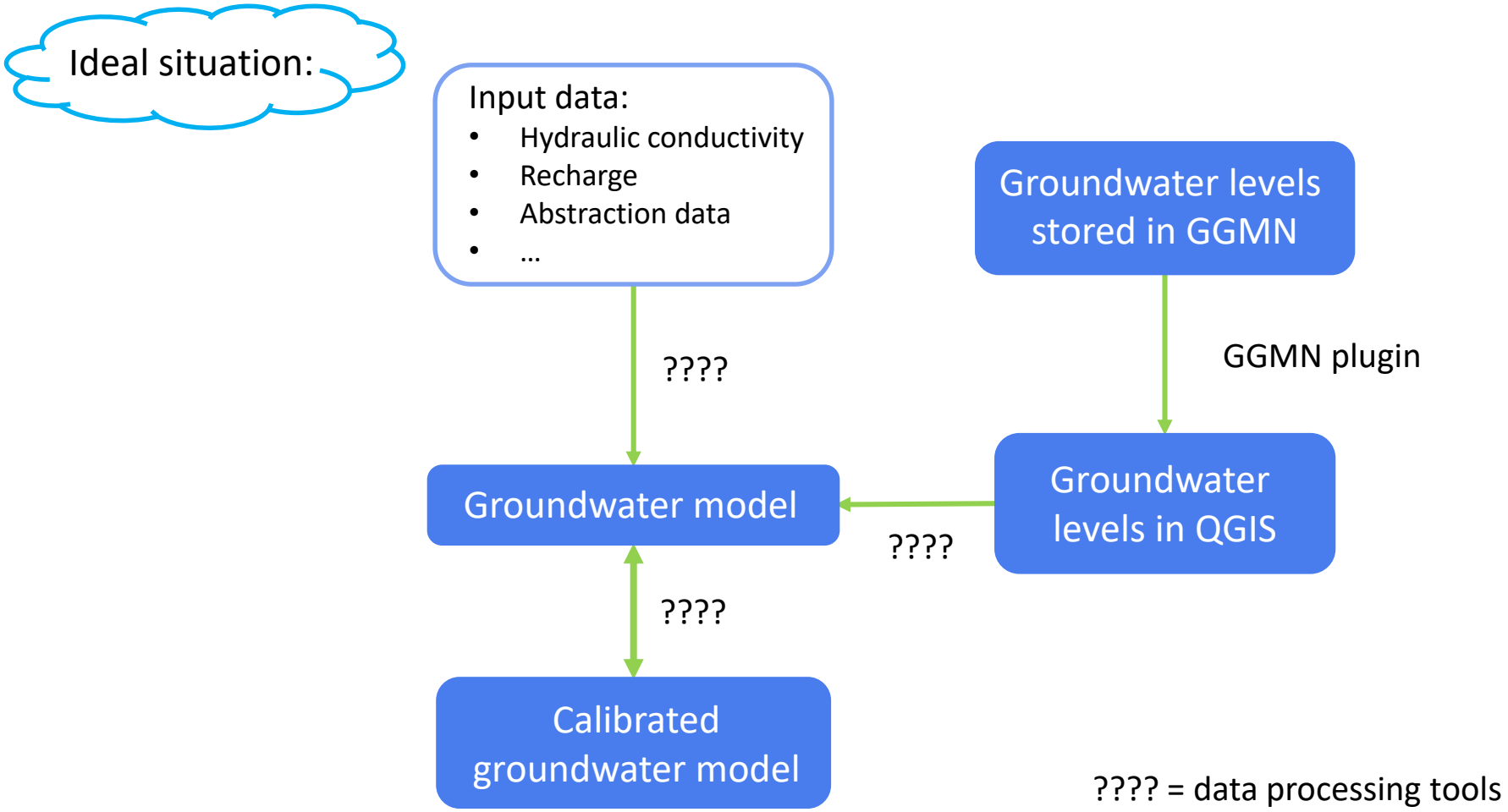
22-Jan-18

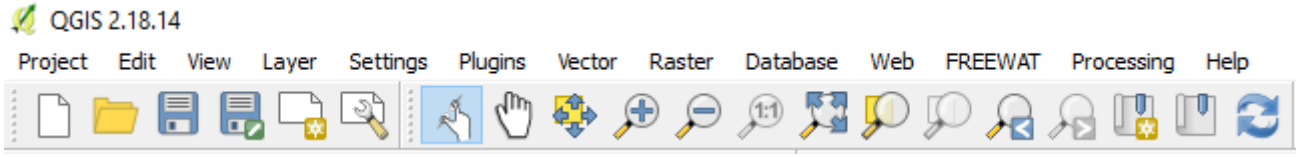
What else to do with my collected data?



FREEWAT

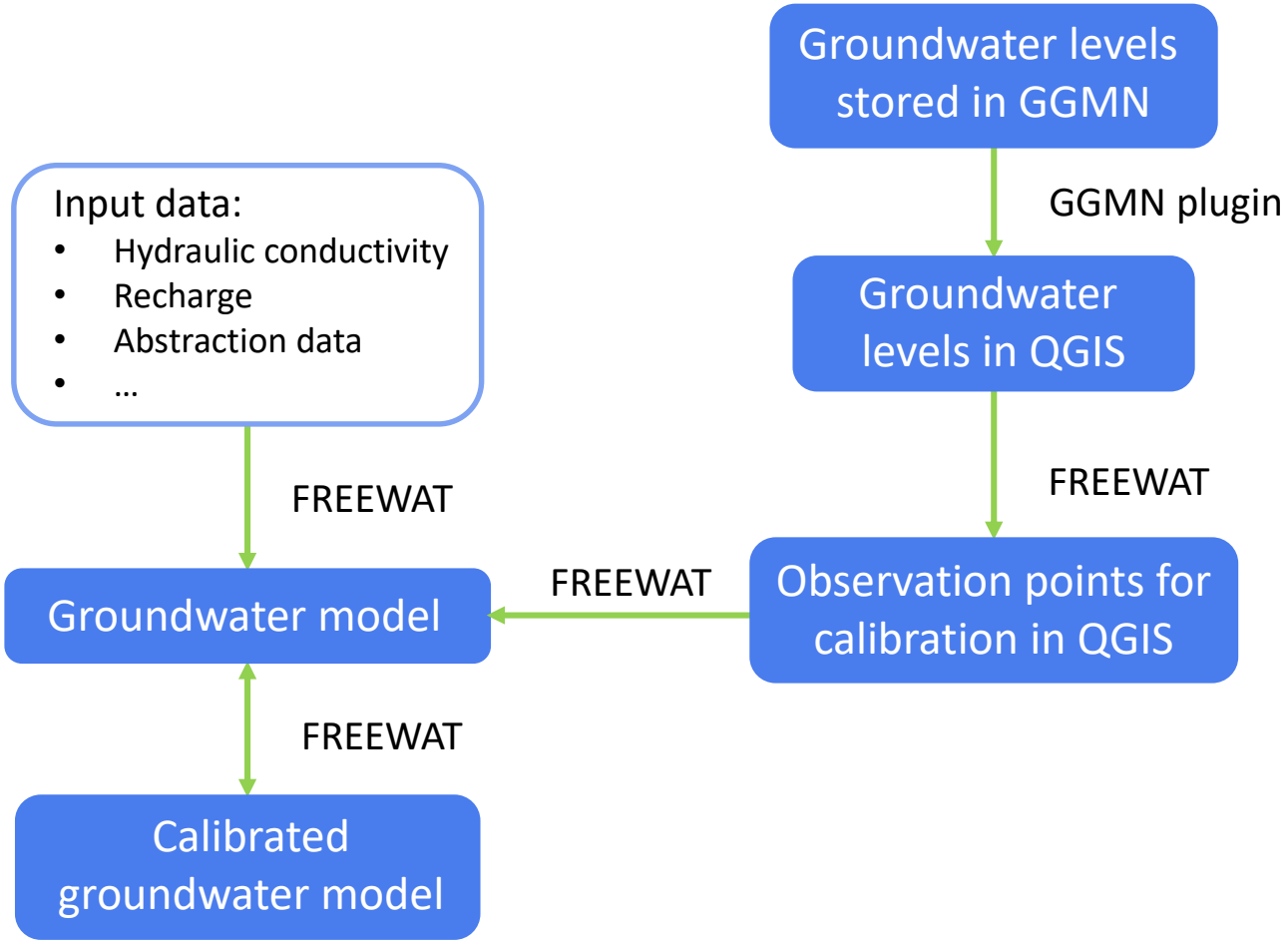
- *FREE and open source tools for WATer resource management* is an **HORIZON 2020** project financed by the EU Commission

- FREEWAT is conceived as a <u>composite plugin</u> for QGIS

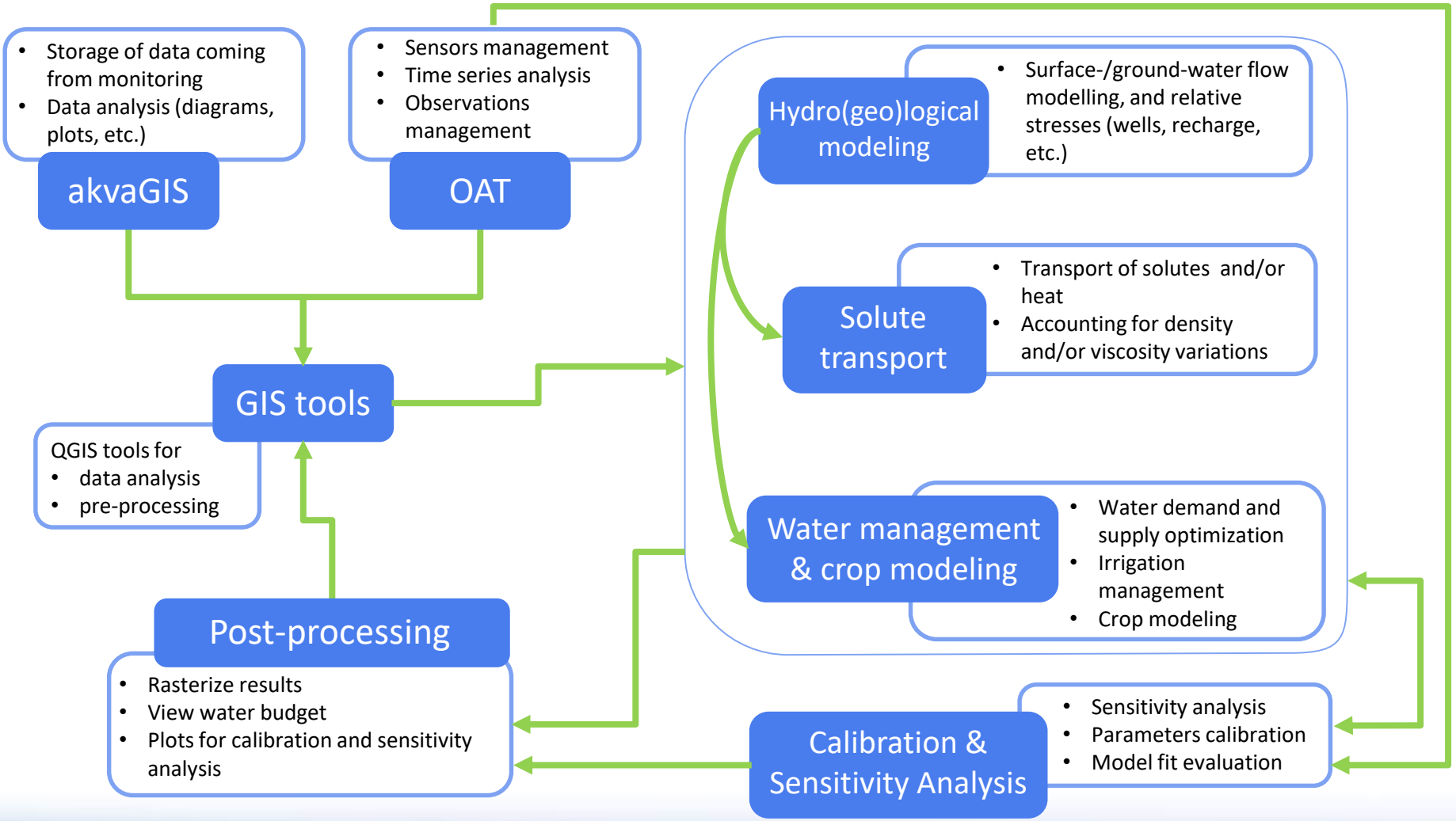


  - *Pre- and post-processing of data*
  - *Model calibration and sensitivity analysis*
  - *Model simulation*
  - *Analysis, interpretation and visualization*

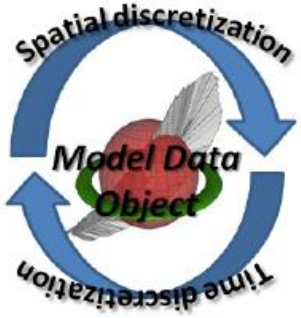
Integration in QGIS using FREEWAT



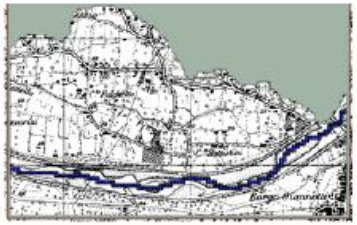
FREEWAT Modules



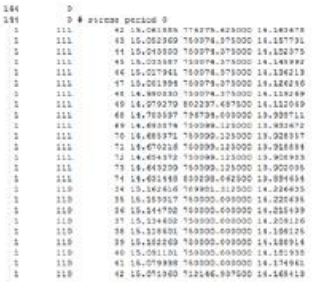
Groundwater flow modeling using FREEWAT



Organize

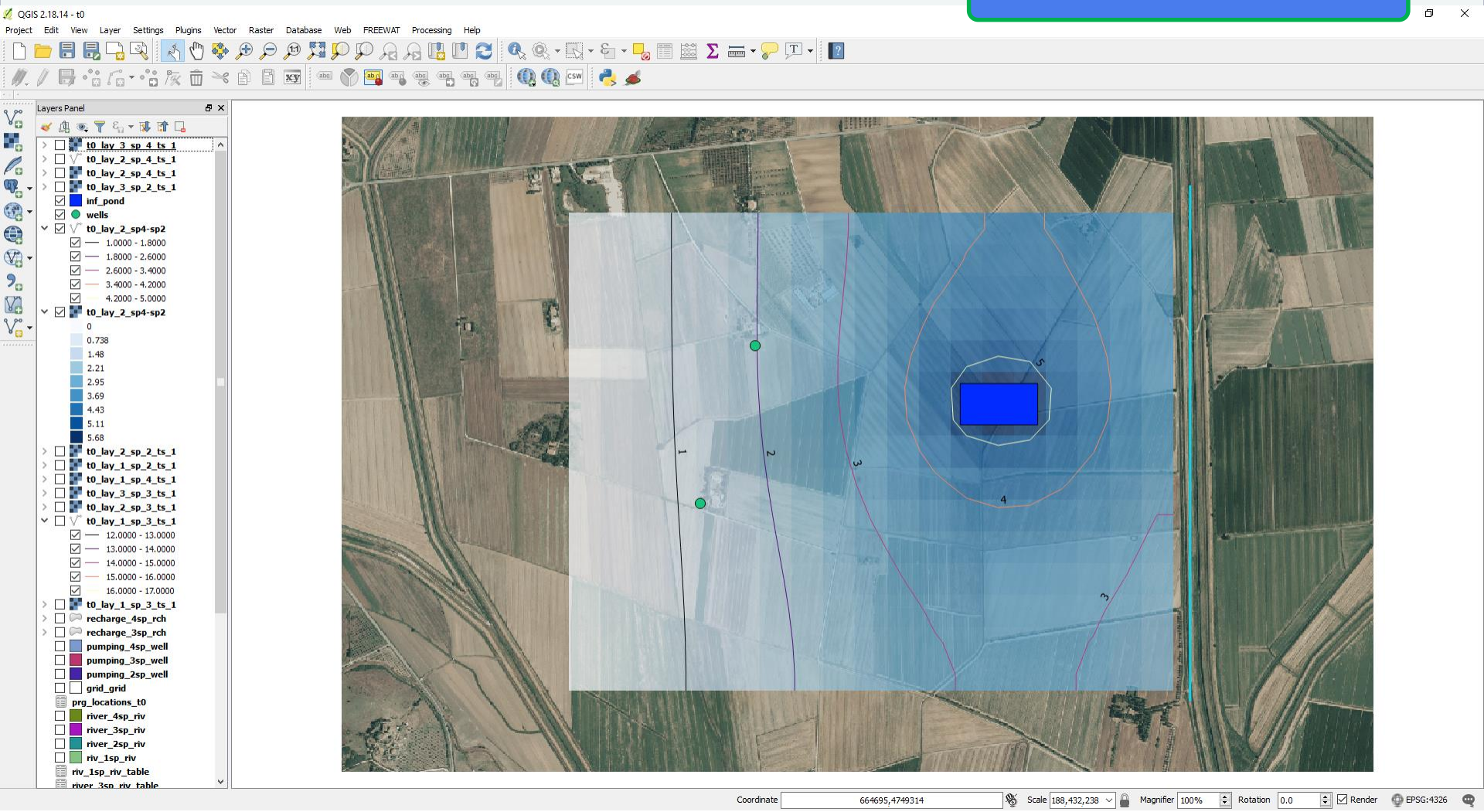


Create the model



Run!

Groundwater model in MODFLOW



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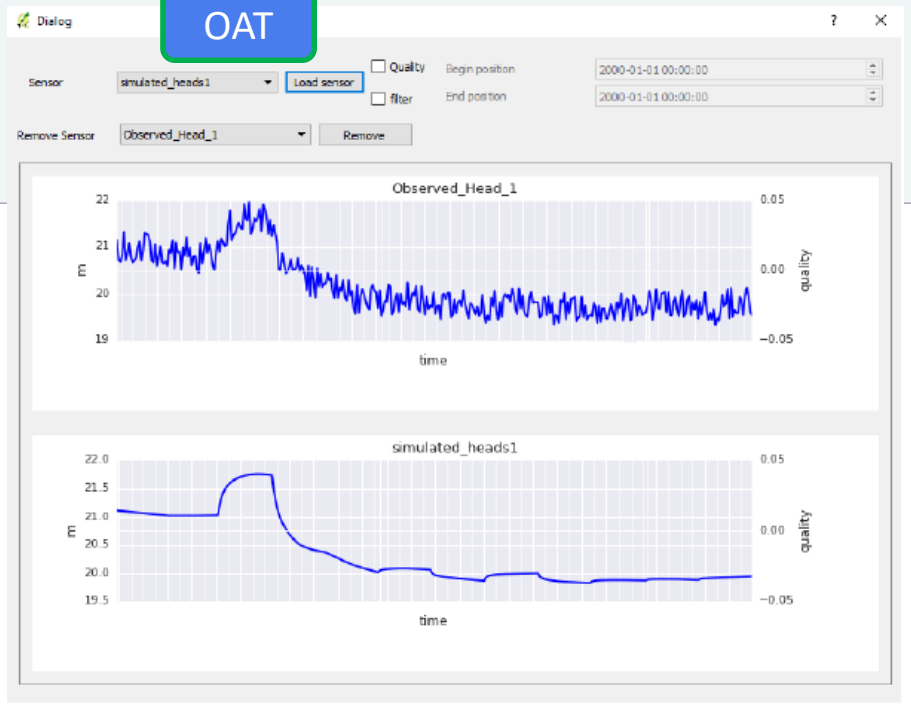
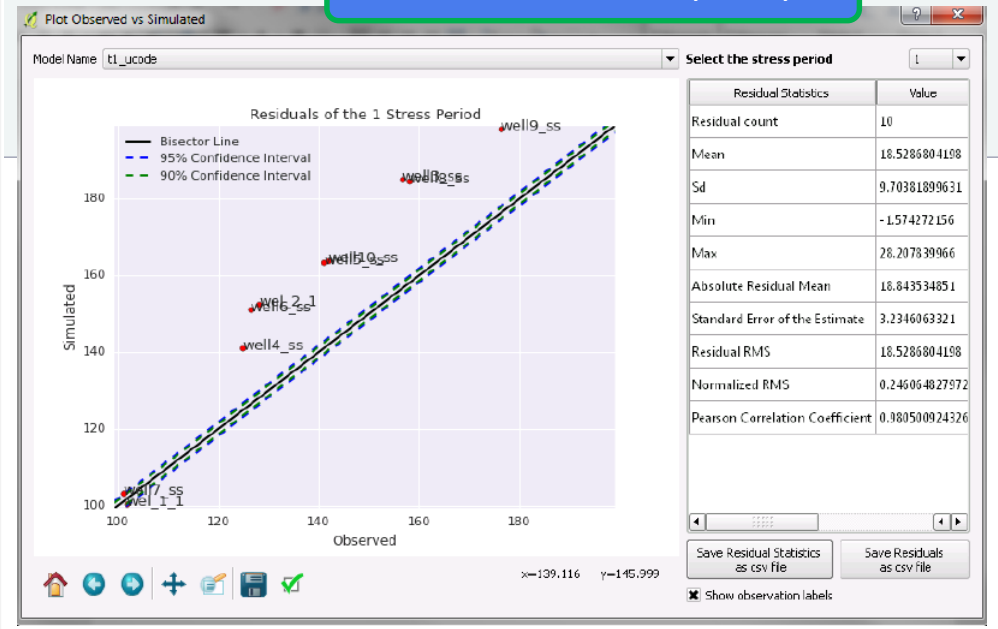
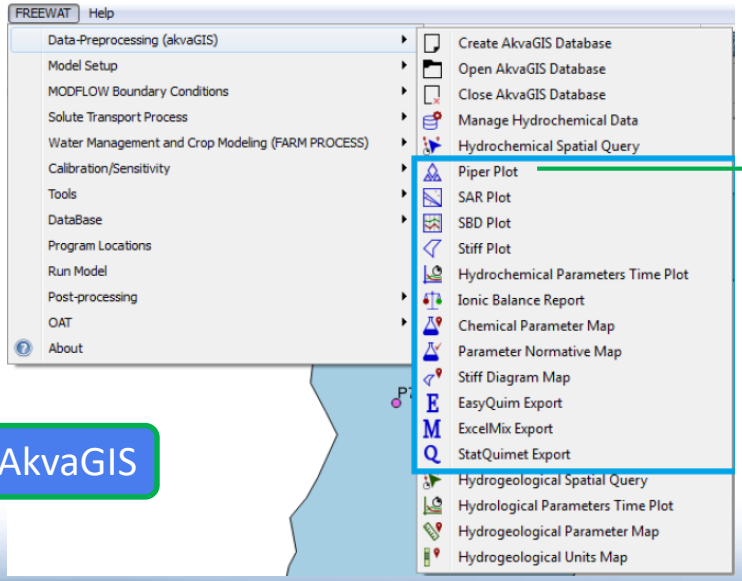
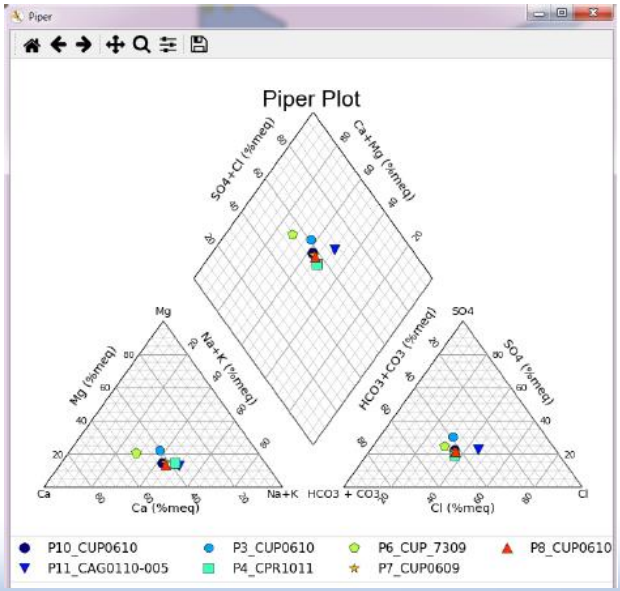


Calibration & sensitivity analysis



AkvaGIS





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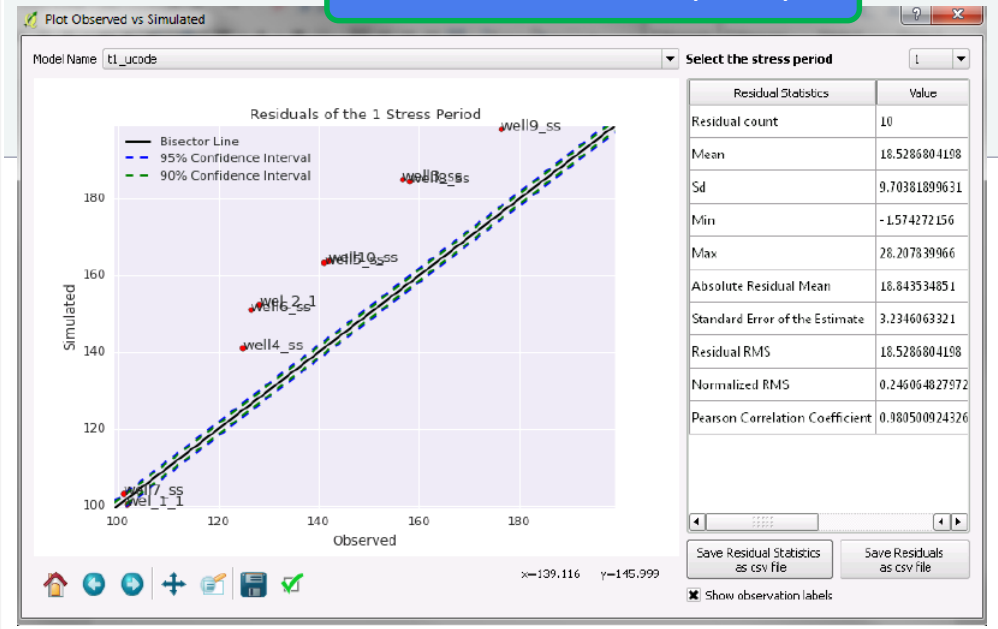
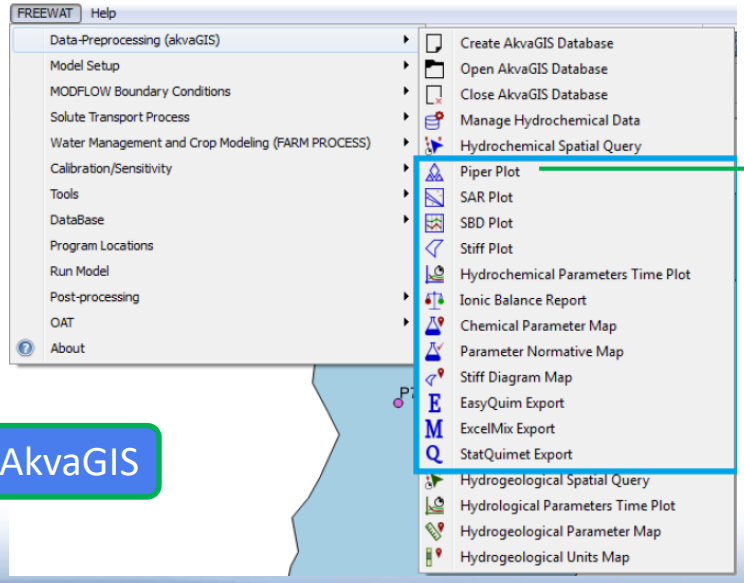
Calibration & sensitivity analysis





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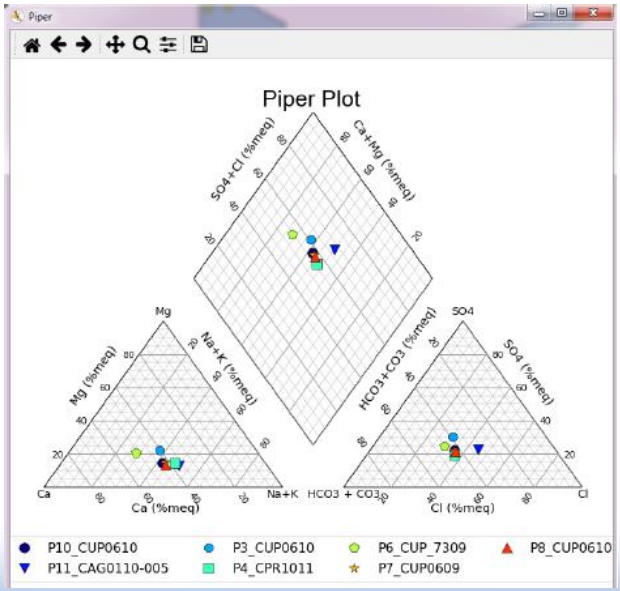

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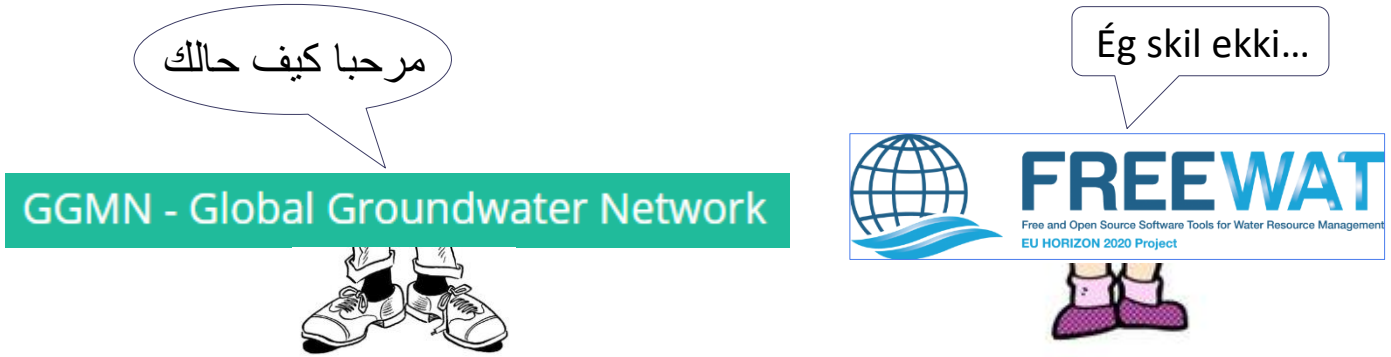
Further integration of GGMN and FREEWAT

- Better integration between GGMN and FREEWAT



- Expand community

GitHub

stackoverflow

StackExchange

Google Groups

reddit

YAHOO! Answers

Q

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International Groundwater Resources Assessment Centre

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United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

World Meteorological Organization

Government of The Netherlands