Mémoire de Bachelor en Systèmes Naturels

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FACULTÉ DES SCIENCES

GIS programming for the resolution of conflicts within groundwater protection zones & hydrogeological monitoring of Villarepos' former landfill
By Lilian Lonla, academic year 2021/2022

Problematic

In the canton of Fribourg, several buildings and economic activities are located within groundwater protection zones, resulting in an increased risk of loss of water quality.

Former abandoned landfills are a potential source of pollutants and need regular monitoring to protect surrounding aquifers and surface waters.

Results

A Python script has been developed to automate the sourcing, loading and styling of geospatial information about the cadaster and different groundwater protection zones, using the PyQGIS API.

The groundwater near and within Villarepos's former landfill has been shown to contain high concentrations of nitrate and nitrite compounds, likely due to the leaching of organic materials.

PyQGIS Programming
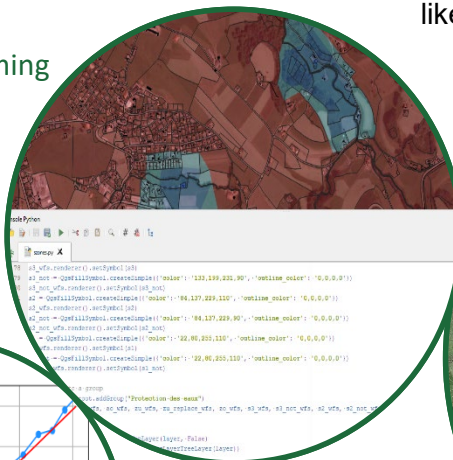
Pumping test analysis
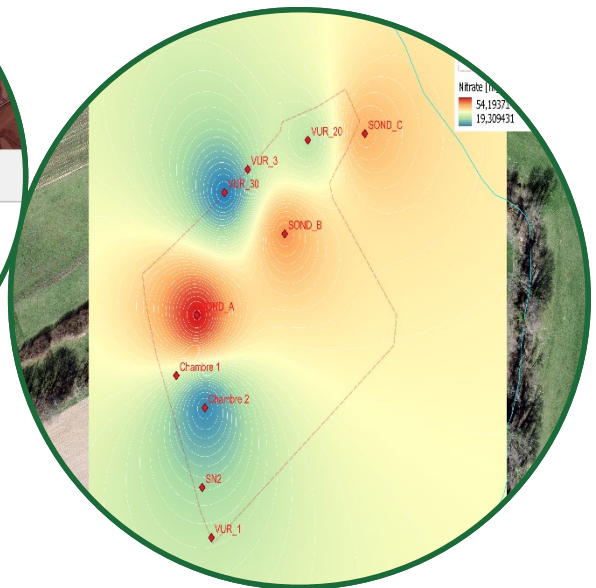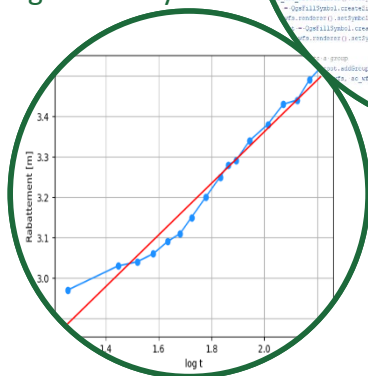
Spatial distribution of nitrates within and near the landfill

Gathering information about the location of buildings as well as agricultural and industrial activities within groundwater protection zones can be a tidious task which can fortunately be automated with the use of GIS (Geographic Information Systems) programming.

For Villarepos' former landfill, the results of the hydraulic pumping test show that there is a possibility of percolation towards the local river. However, sampling analysis indicates that the pollution is concentrated near the landfill and is mainly comprised of nitrogen-based compounds.

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