

Analyzing Groundwater Quality Data and Contamination Plumes: GWSDAT

Bob Hendricks[#], Wayne Jones[^], Luc Rock^{*}

[#] Shell Global Solutions International B.V., US; [^] Shell Global Solutions (UK) Ltd.; ^{*} Shell Global Solutions Canada Inc.



What is GWSDAT?

GWSDAT Summary:

- A user friendly, open source, decision support tool for the analysis and reporting of groundwater monitoring data
- Smoothing Statistics: data analysis using **spatiotemporal** non parametric regression technique
- Rapid interpretation of plume behavior using plume metrics (mass, concentration, area)
- Latest feature - Well redundancy analysis: assess influence of wells on site understanding

Key Benefits:

- Improved data transparency to design and optimize groundwater monitoring
- Clarity on the relations between dissolved contaminant concentrations, NAPL thicknesses, and groundwater flow
- Rapid interpretation of complex data sets from large groundwater monitoring networks
- Facilitated report and graphics generation

How does it work?

Step 1: Access GWSDAT

Online:



University of Glasgow

www.gwsdat.net

Excel Add-in:

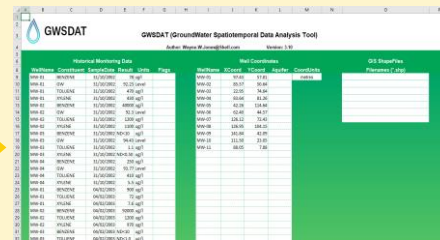


www.api.org/GWSDAT

R package:

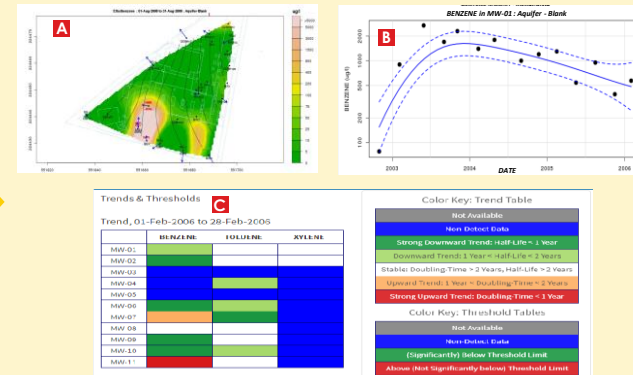


Step 2: Enter Your Data



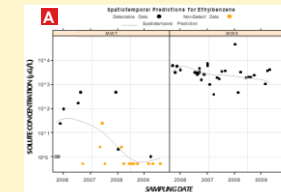
- Enter data via a standard intuitive spreadsheet
- Add shapefile for basemap

Step 3: Interactively Analyze Your Data

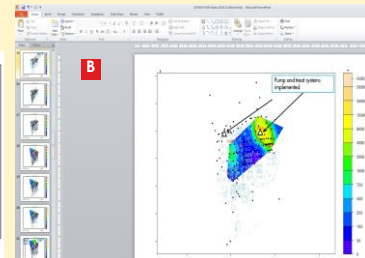
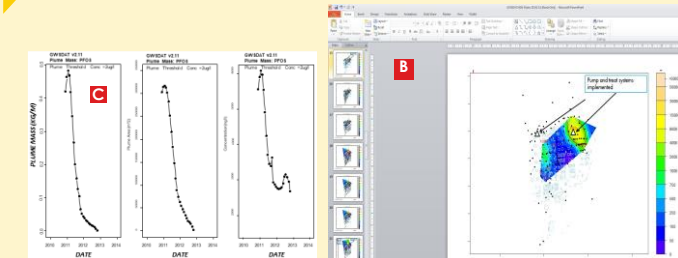


- Concentration contour maps (Panel A)
- Individual well concentration trend plots (Panel B)
- Concentration trend and threshold indicator matrix (Panel C)

Step 4: Report Generation



- Plots can be exported (Panel A)
- Export a sequence of plots of different time slices (Panel B)
- Export plume metrics graphs (Panel C)



More information?

- Jones et al. (2014) A software tool for the spatiotemporal analysis and reporting of groundwater monitoring data. Environmental Modelling & Software: 55, p242-249 (doi:10.1016/j.envsoft.2014.01.020)
- Jones et al. (2015) Analyzing Groundwater Quality Data and Contamination Plumes with GWSDAT. Ground Water: 53:4: p513-514 (doi: 10.1111/gwat.12340)
- Bowman et al. (2015) Efficient and automatic methods for flexible regression on spatiotemporal data, with applications to groundwater monitoring. Environmetrics (DOI: 10.1002/env.2347)
- Jones et al. (2022). Groundwater Spatiotemporal Data Analysis Tool: Case Studies, New Features and Future Developments. Groundwater Monitoring and Remediation. <https://ngwa.onlinelibrary.wiley.com/doi/10.1111/gwmr.12522>