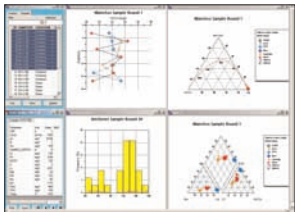


AquaChem

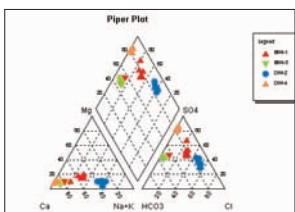
Water Quality Data Analysis, Plotting, Reporting, and Modeling



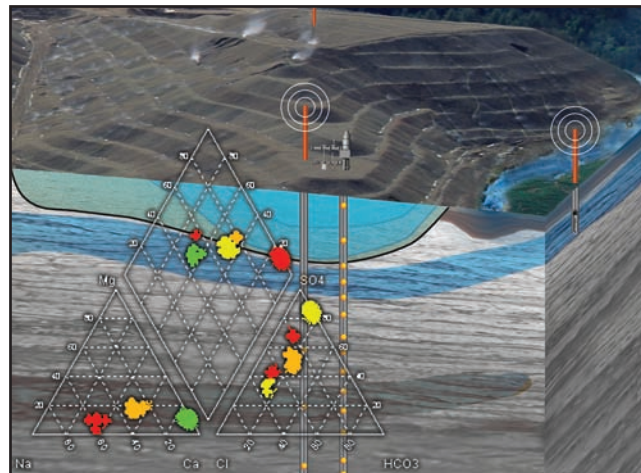
Multi-plot views and tables



Highlight exceedences



Piper plot



Applications:

- Manage and report water quality data from municipal supply wells
- Compliance reporting of water quality data collected at sanitary landfills and contaminated sites
- Analyze water sample data during Aquifer Storage and Recovery (ASR)
- Assess aqueous geochemical interactions during acid mine drainage
- Identify mineralization trends in groundwater during mining exploration

Overview

Groundwater resource management, industrial projects, and mine sites require continuous monitoring and collection of water samples to ensure compliance with local regulatory guidelines. Numerous water samples are collected from the field and analyzed in the lab, providing water specialists the critical data necessary for understanding overall water quality conditions at the site. The aqueous geochemistry and general water quality findings determine water uses, highlight areas of concerns, and provide support for mitigating risks to human health and the environment. However, making sense of the vast amounts of data produced by the analytical laboratories requires a comprehensive data management system.

AquaChem* is ideal for groundwater and surface water projects requiring management, analysis, plotting, and reporting of water quality data. AquaChem features a fully customizable database of physical and chemical parameters and a comprehensive selection of analysis, calculation, modeling, and graphing tools.

AquaChem's analysis capabilities cover a wide range of functions and calculations frequently used for analyzing, interpreting, and comparing water quality data. AquaChem includes QA/QC tools for effective comparison of duplicates, outliers, and management of non-detects. Efficiently analyze trends for tens or hundreds of samples and parameters in minutes, with confidence. These powerful analytical capabilities are complemented by a comprehensive selection of commonly used plotting techniques to represent the chemical characteristics of aqueous geochemical and water quality data.

For in-depth geochemical modeling, AquaChem provides powerful geochemical reaction modeling capabilities using the USGS engine PHREEQC. AquaChem is truly one of the most powerful tools available for interpretation, analysis and modeling of simple or complex water quality data sets.

AquaChem is compatible with:

- Visual MODFLOW Pro*
- Hydro GeoAnalyst*

The complete solution for water quality data management! AquaChem is the most widely used software package specifically developed for graphical and numerical analysis and modeling of water quality data. It features a fully customizable database of physical and chemical parameters and provides a comprehensive selection of analysis tools, calculators and graphs for interpreting, plotting and modeling water quality data.

Data Management	<ul style="list-style-type: none"> AquaChem utilizes the MS Access™ relational database system for maximum performance and flexibility Easy-to-use query interface allows you to create and execute simple queries; use SQL commands for advanced finds NEW Export data, reports, or spreadsheets directly to MS Excel™ 	<ul style="list-style-type: none"> Direct link to a customizable lookup table containing more than 560 common inorganic and organic chemicals Synchronize with a Hydro GeoAnalyst® SQL Server database for advanced analysis and interpretation Querying to find extreme data points and exceedences
Data Entry/Export	<ul style="list-style-type: none"> Import water quality data directly from MS Excel™ (.xlsx) NEW MS Access database (.accdb) NEW, Text Files, and U.S. NWIS Export station location and attributes to ESRI® Shapefiles Automatic importing and matching of data to CAS Registry #s 	<ul style="list-style-type: none"> Fast, flexible, and easy data entry using tabular views of multiple samples, or form views of individual samples Save all import settings for re-use with other similar data sets Export data to Google Earth™ .kml file format NEW
Water Quality Standards	<ul style="list-style-type: none"> Built-in standards from WHO, U.S. EPA, and CCME Import/customize virtually any set of water quality standards Quick generation of Water Quality Exceedance Reports Compare samples to percentage of standard value 	<ul style="list-style-type: none"> Water quality exceedance values are automatically flagged for individual samples or tabular summary of multiple samples Compare samples to U.S. EPA Hardness-Dependent standards - calculate chronic, acute, total, and dissolved concentrations NEW
QA/QC	<ul style="list-style-type: none"> Rigorous management of non-detect values now follow official U.S. EPA's "Guidance for Data Quality Assessment, Practical Methods for Data Analysis" EPA QA/G-9, QA00 Graphically highlight levels of exceedance for each sample 	<ul style="list-style-type: none"> Identify samples with concentrations that fall outside defined natural occurrence interval, or that exceed solubility Relative Percent Difference (RPD) analysis and reporting for comparing duplicate samples, and highlighting exceedences NEW
Statistical Analysis	<ul style="list-style-type: none"> Statistical trends analysis: Linear Regression, Sen's Test, Mann- Kendall and Mann- Kendall Seasonal Test Efficiently generate multiple trend, outlier, and normality analyses for multiple stations and parameters, using batch mode NEW Statistical Outlier Tests: Dixon's Test (Extreme Value Test), Discordance Test, Rosner's Test, Walsh's Test Test for Normality: Studentized Range Test, Geary's Test, 	<ul style="list-style-type: none"> Shapiro Wilk Test, Variance Coefficient, D'Agostino's Statistical Functions: Quantiles, Confidence Intervals, Skewness T-Statistics, Kurtosis, Tolerance Intervals, Prediction Intervals Test for Alert Levels: Define the concentration limit between what is considered background concentration and contamination NEW Identify number/percentage of non-detect values, or number / percentage of non-detects above or below standard
Plotting/Graphing	<ul style="list-style-type: none"> Correlation Plots: Scatter, Ludwig-Langelier, Depth Profile, Wilcox, Geothermometer, Meteoric Water Line Summary Plots: Box & Whisker (Multiple Stations, Grouped) Frequency Histograms, Quantile, Detection Summary, Stacked Bars (Distance) NEW, Stacked Bars (Stations) NEW Batch generate Multiple Time Series or Box & Whisker Plots Multiple Parameter Plots: Piper, Durov, Ternary, Schoeller, Giggenbach Triangle, Box & Whisker Time-Series Plots: Multiple Parameters, Multiple Stations, Statistical Summary, Box & Whisker, Stacked Bar Chart Enhanced Durov Plot with additional parameters: pH, TDS Single Sample Plots: Radial, Stiff, Pie Thematic Map Plots: Pie, Radial, Stiff, Plain Symbol, Proportionate Symbol, Proportionate Grayscale Symbol Streamlined GUI facilitates quick and accurate plot designs 	<ul style="list-style-type: none"> All plots are dynamically linked to the Sample List and are updated on-the-fly as samples are added or modified All plots may display data for all samples in the Sample List, or only for selected samples Calculate and store an average sample at a well location Data inspection tool displays parameter values for any point on any plot simply by clicking on the point of interest Advanced symbol labeling options with annotation Save multiple plot configurations for easy recall and analysis Enhanced PDF export for plots Import plot layouts from other AquaChem projects NEW Automatically generate water standard limit line Import and display hydrographs of water levels, temperature, precipitation, on time series plots to compare and correlate to trends in water quality
Reporting & Printing	<ul style="list-style-type: none"> A custom Report Designer allows you to create sample reports containing any set of selected parameters and to format the design and presentation of the results QA/QC Report compares sample to one or more duplicates to determine relative percentage difference 	<ul style="list-style-type: none"> Improved Template Designer simplifies creation of customized page layouts for printing Reports or Plots Advanced symbol labeling with options to position sample labels anywhere on the plot (with connecting lines) Reports in spreadsheet format can be saved to MS Excel™
Water Quality Modeling	<ul style="list-style-type: none"> Direct link to USGS PHREEQC v.2.15 to calculate the saturation indices, activities or pH for selected water quality samples and seamlessly save the results back into AquaChem Support for Pitzer equations for saline waters or brines 	<ul style="list-style-type: none"> Built-in link to the USGS GUI PHREEQC for water quality modeling Generate PH3TD input for Visual MODFLOW Pro Use Equilibrate to calculate the amount of minerals precipitated as the solution is evaporated or heated
Built-In Tools	<ul style="list-style-type: none"> Decay Calculator: Estimates the chemical concentrations based on decay rates for air, soil, groundwater or surface water Volume Concentration Converter: Converts volume concentration (ppm) of a specified chemical formula to mass concentration (mg/m³) Special Units Converter: Converts values from one measurement unit to another for measurements such as Alkalinity - HCO₃⁻, and Conductivity (us) - Resistivity (Ohm/cm) Unit Calculator: Converts values for most common unit categories, new unit conversion can be added Formula Weight Calculator: Calculates the formula weight of virtually any organic or inorganic chemical Various scaling and corrosion indexes (Langelier, Ryncar, Puckorius, Larsen Skold) 	<ul style="list-style-type: none"> UTM (Projected) to Geographic coordinates converter Alk > HCO₃⁻, CO₃²⁻, calculates the concentrations of the species HCO₃⁻ and CO₃²⁻ based on a given pH and alkalinity - e.g. reporting HCO₃⁻ and/or CO₃²⁻ concentrations when only alkalinity values are available Search for stations and samples that are located at a given distance from another station Dissolved Oxygen Calculator: Estimates oxygen concentrations as a function of temperature and elevation Redox Water Type - Classifies water according to its redox state based on redox-sensitive parameters Species Converter: Converts any species into a different form. This is useful to express a measured parameter as a different aqueous species when expressed in mg/L