



ANALYTHIUM

IN ASSOCIATION WITH



CLEAR-SITE
SOLUTIONS

INTEGRATION OF AUTOMATION AND MACHINE LEARNING IN ENVIRONMENTAL
ASSESSMENT AND CONTAMINANT FATE AND TRANSPORT MODELLING

A Practical Solution to Cost-Effective Liability Management

PRESENTATION OUTLINE

- Why is **data driven** decision making so **elusive**?
- How to **simplify** the process and cut the noise
- Its not science fiction – **lower cost, faster output** and **higher quality** results (Case Study)



WHY IS DATA-DRIVEN DECISION MAKING SO ELUSIVE?



CASE STUDY



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Project Highlights:

- 16 Site Specific Risk Based Closure Reviews
- Complex site histories (more than 20 years of historical reporting and data collection)
- Deep impacts (up to 20 m bgs)
- Active monitoring and assessment programs in place with plans for implementation of an *in-situ* remediation system
- Variable lithology and background conditions



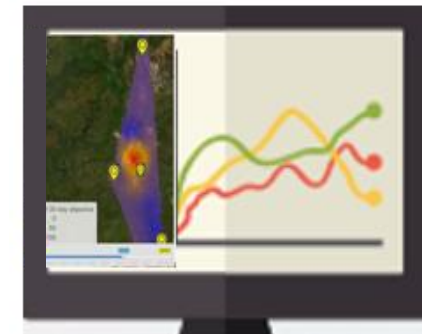
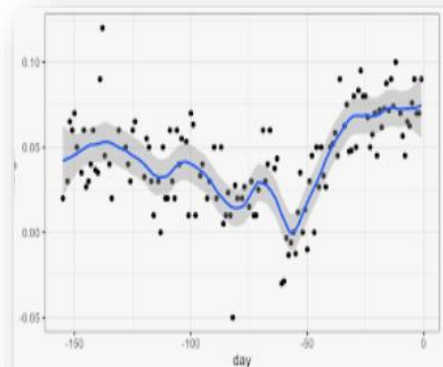
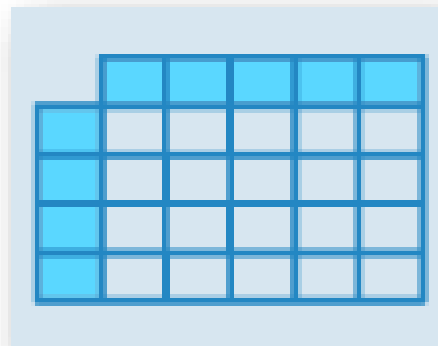
PROCESS FOR DATA DRIVEN DECISION MAKING

2. Ingredients

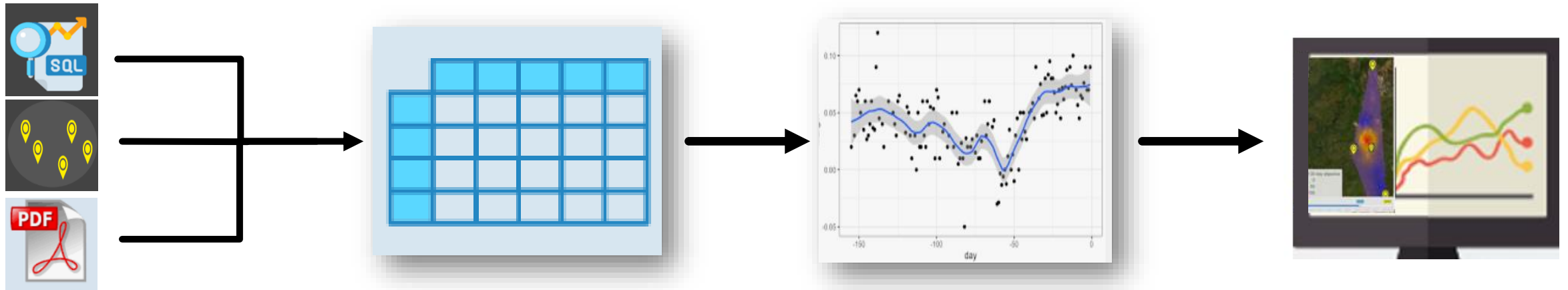
3. Recipe/Preparation

4. Recipe/Preparation

I. Objective



CASE STUDY (OBJECTIVE)



- Volume of Contamination (**remedial liability**)
- Concentration of chloride over time at a receptor (x) (**estimate risk to receptor**)
- Number of redundant GW wells (**monitoring optimization**)



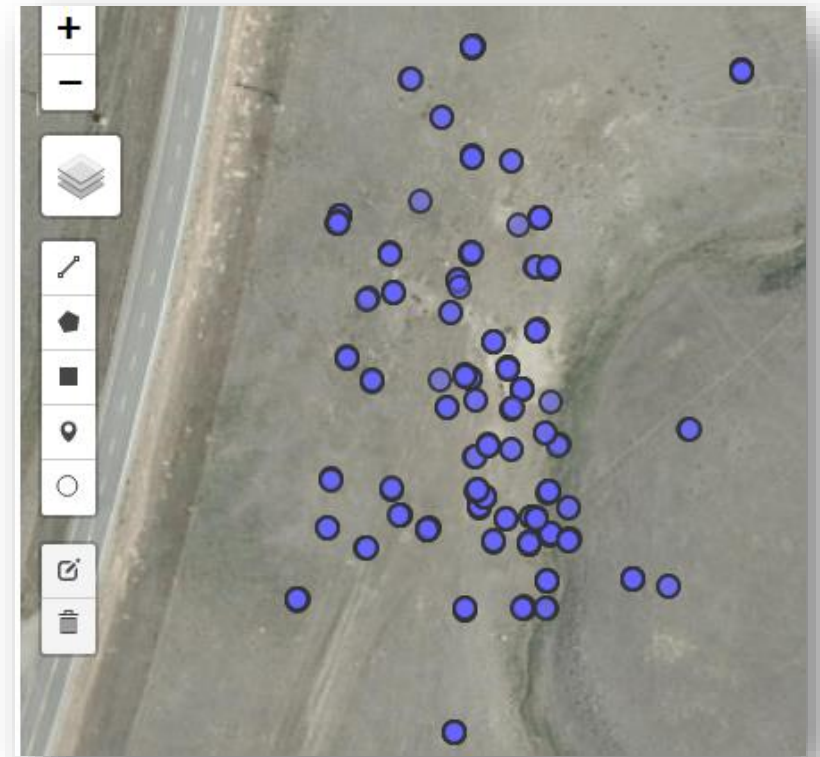
SOIL DATA

Filter based on table

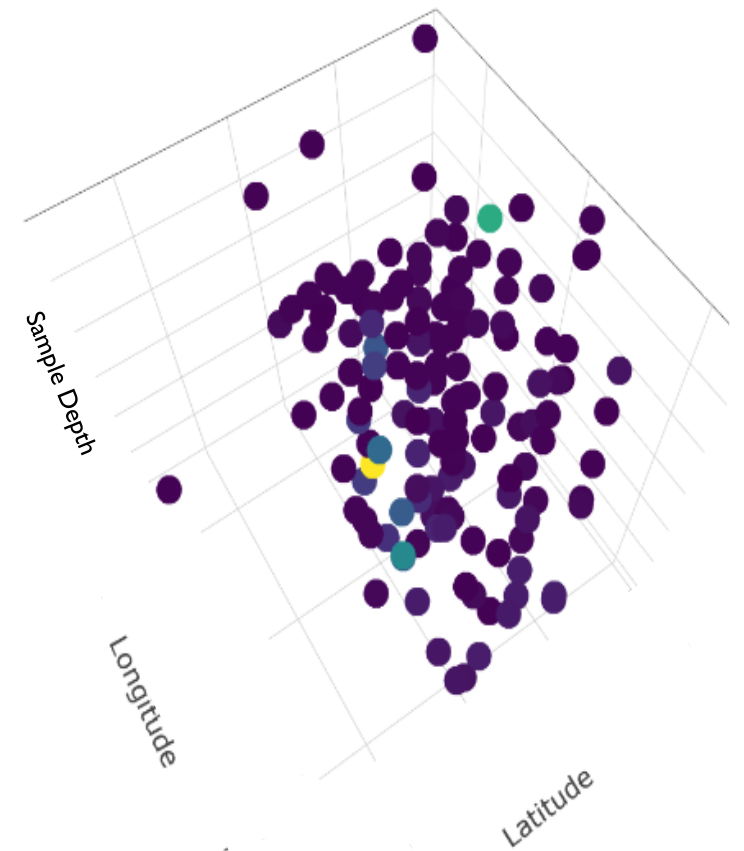
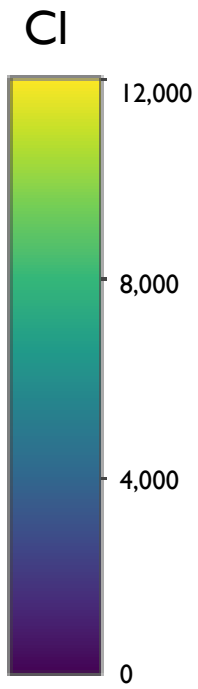
Show entries

Search:

ID	Longitude	Latitude	Area	Depth.Interval	pH	chloride
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001.BH06-01_01-	Hidden to maintain client confidentiality			0 – 1.50 m	7.8	470
002.BH06-01_01-	Hidden to maintain client confidentiality			2 – 2.50 m	8.1	1,450
003.BH06-01_01-	Hidden to maintain client confidentiality			8 – 8.25 m	7.5	11,790
004.BH06-01_01-	Hidden to maintain client confidentiality			12 – 13.5 m	7.7	220



SOIL – VOLUME OF CONTAMINATION (REMEDIAL LIABILITY)



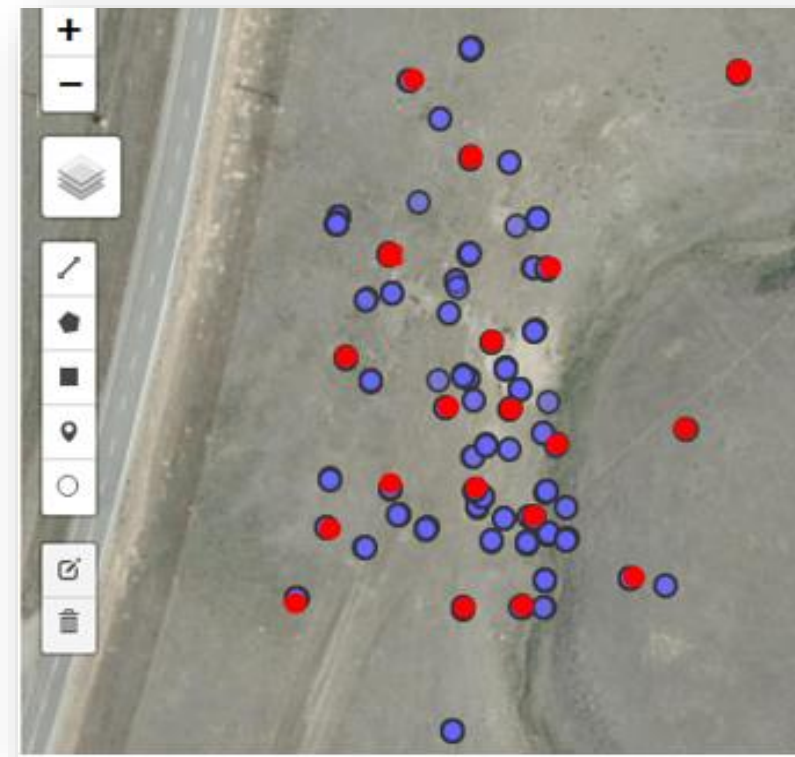
GW – CHANGE IN CONCENTRATION OVER TIME & SPACE

Filter based on table

Show entries

Search:

ID	Longitude	Latitude	Area	Date	PH	Chloride
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Monitoring Well #1	Hidden to maintain client confidentiality			2006-05-20	7.2	400
Monitoring Well #1				2007-06-04	7.5	425
Monitoring Well #1				2009-05-17	7.4	1,400
Monitoring Well #1				2011-07-17	7.4	1,350

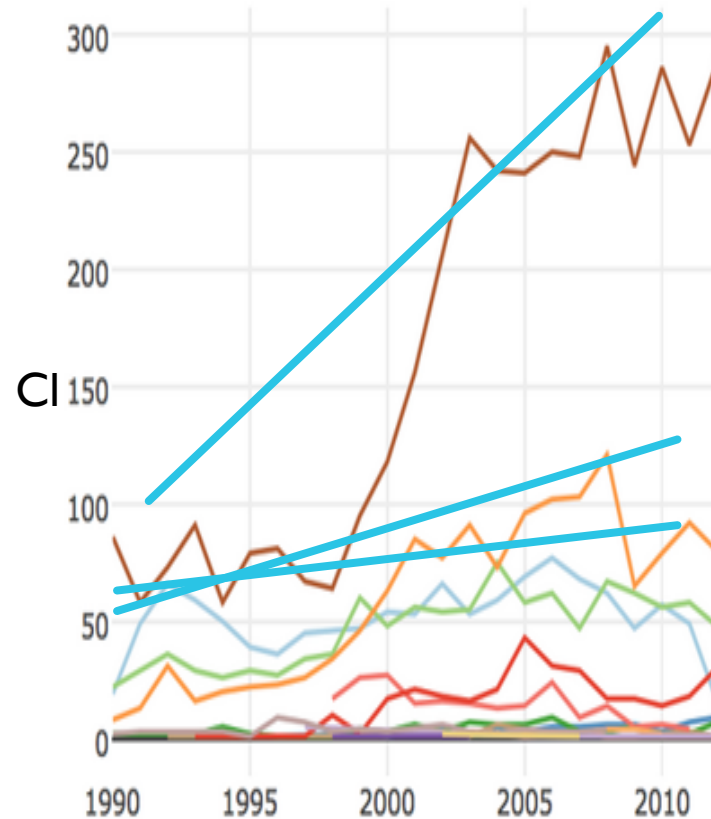


GW – CHANGE IN CONCENTRATION OVER TIME & SPACE

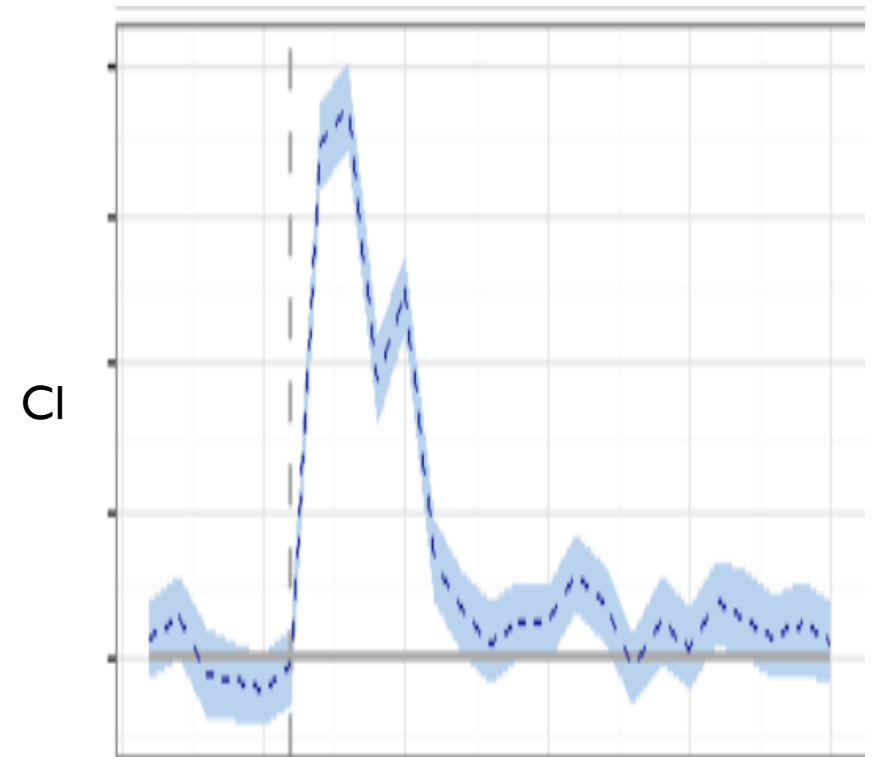
Interpolation 2D



Trending MK/Sen's Slope

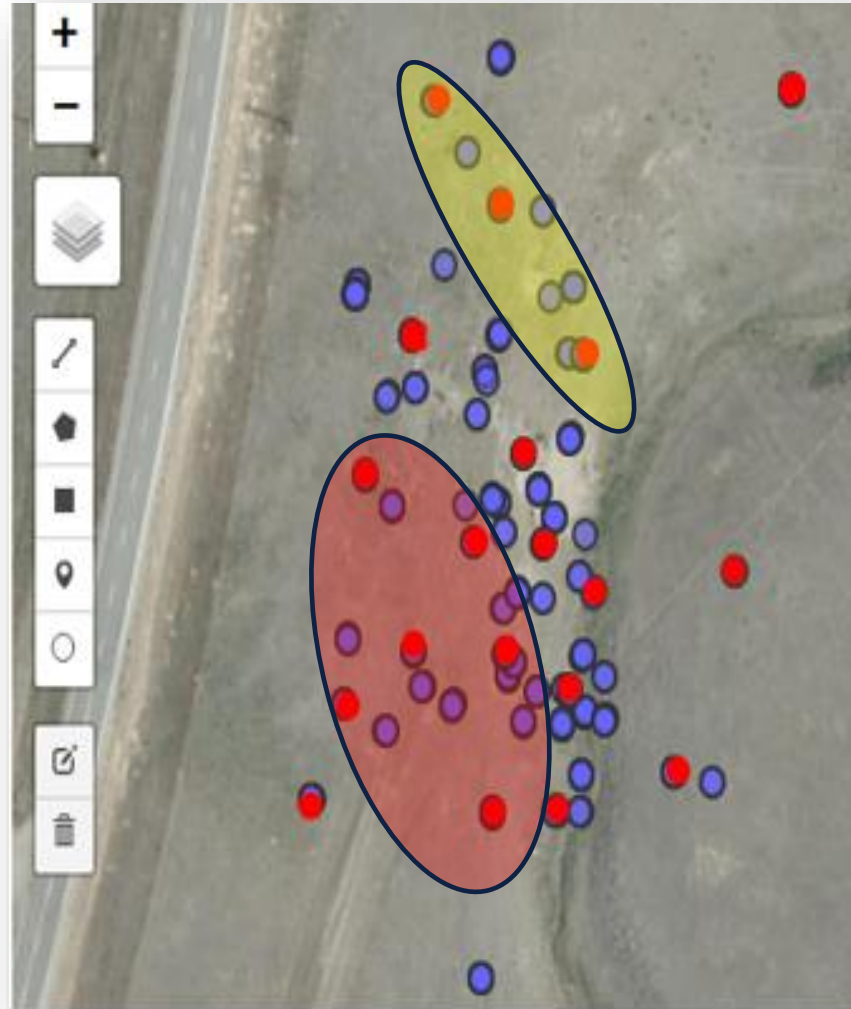


Forecasting



GW MONITORING NETWORK OPTIMIZATION

Grouping of GW Wells



CASE-STUDY RESULTS

1. Reduced data to only a few ingredients of importance → **Focus on What Matters**
2. **Detailed Analytics** for all users from a simplified platform
3. Volume estimate → **Liability Analysis**
4. Monitoring Network **Optimization** → reduced number of wells requiring future sampling
5. **Contaminant Modeling** over time → risk to receptor
6. **Visual Data** communication → clarity for Subject Matter Experts
7. **Automate** the process

COST EFFECTIVE LIABILITY MANAGEMENT

1. Data was assessed/analyzed with **no money spent on additional collection.**
2. Same Data = New Outcome
3. Clearly defined path to closure in 1 to 2 years with potential for **substantive reductions in overall liability.**
4. Statistically validated **risk-ranking** of sites
5. Process allowed for **clear communication** of results to both the client and relevant stakeholders (regulator)
6. Completed at **lower cost**, with **faster output** and **higher quality** than previously possible

KEEP THE CONVERSATION GOING WWW.ANALYTHIUM.IO/



Brandon Smith

403-827-0550

Brandon.Smith@Analythium.io



Khalid Lemzouji

780-218-1221

Khalid.Lemzouji@Analythium.io