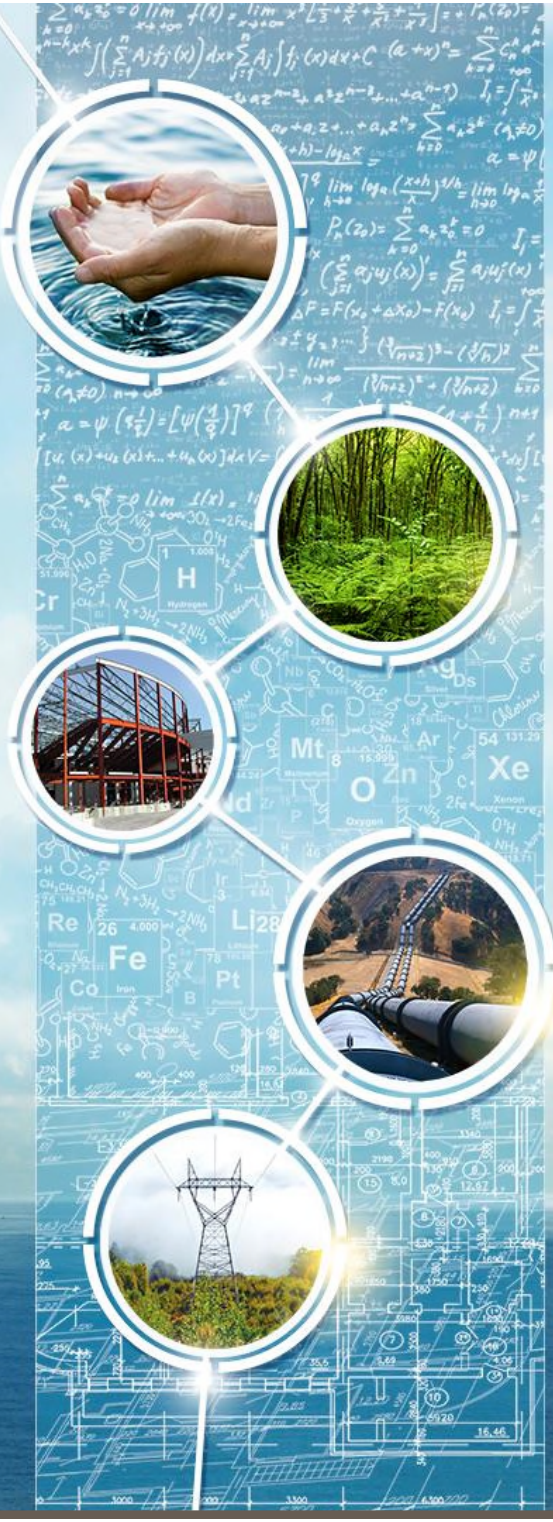

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Dynamic AGC data filtering

SAGEEP 2023 – 04/05/23

Introduction

- Intro – how are data used?
- Dynamic filter overview
- Sample results
- Impact on picking
- Impact on classification

Data Usability

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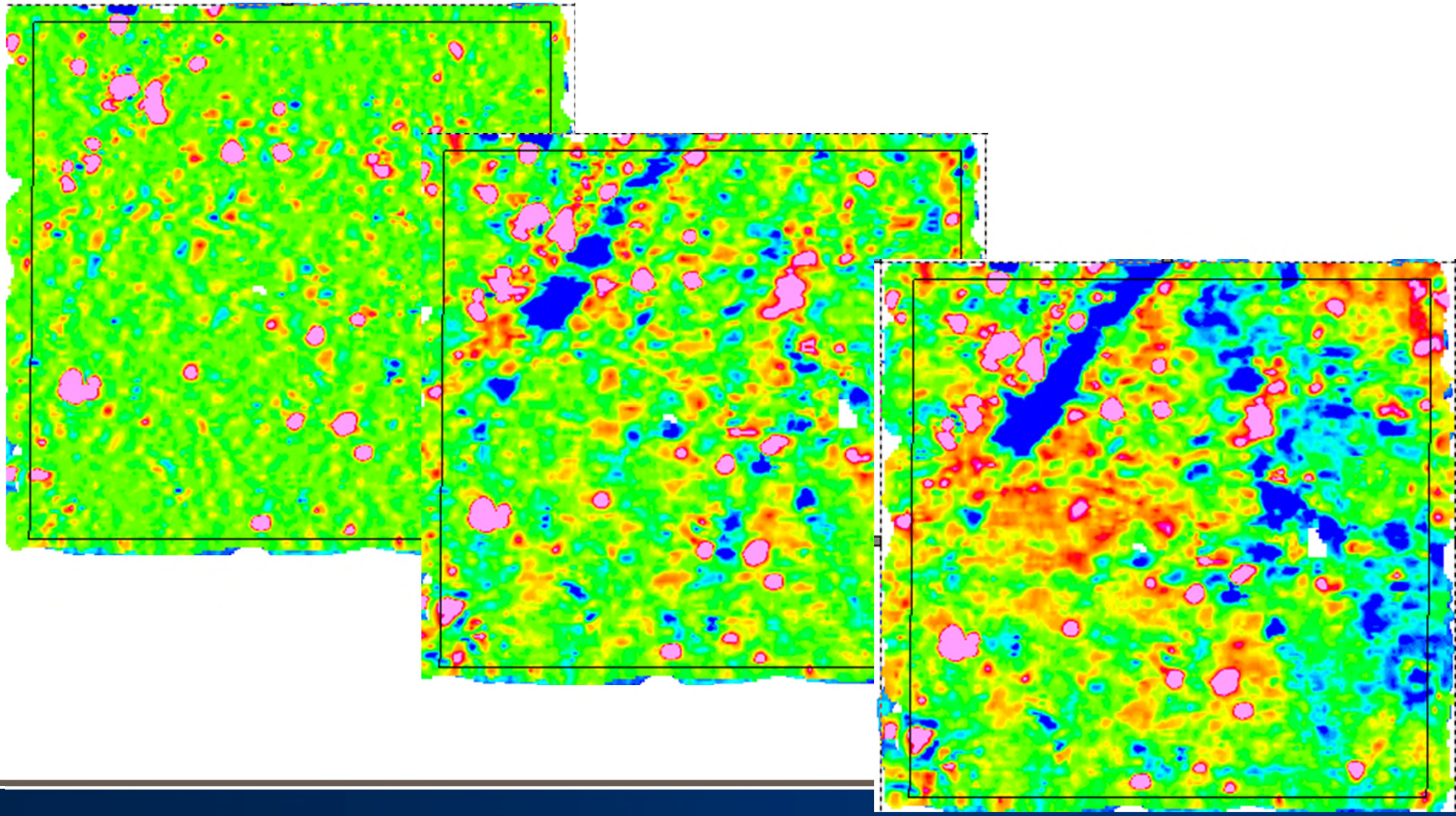
- Dynamic AGC data are used in three ways:
  - Target picking
    - Requires good local background removal so that simple thresholds can be applied
    - Amplitude and profile integrity not a priority
  - Cued background selection
    - Requires good *regional* background removal so that cued backgrounds can be tied to appropriate geologic setting
    - Local background variations and anomaly peaks should be retained
  - Dynamic classification
    - Requires good local background removal, but also good peak amplitude and profile shape retention (minimal distortion)

UXA Filter Parameters

- All available in UXA Help.
- Passes – How many iterations to run.
- Starting amplitude – After removing line average, dummy all values > this starting value. Each successive run reduces this value by half. Assumes no negative values.
- Filter length – Number of data points in moving average window.
- Starting default is 5/10/101
  - First pass uses amplitude of 10, fifth pass uses amplitude of 0.6.
  - Length of 101pts corresponds to approximately 10sec or 10m at full walking speed. Speed is limited by MQO and sample rate, so 101pts filter length is probably much shorter distance than that.

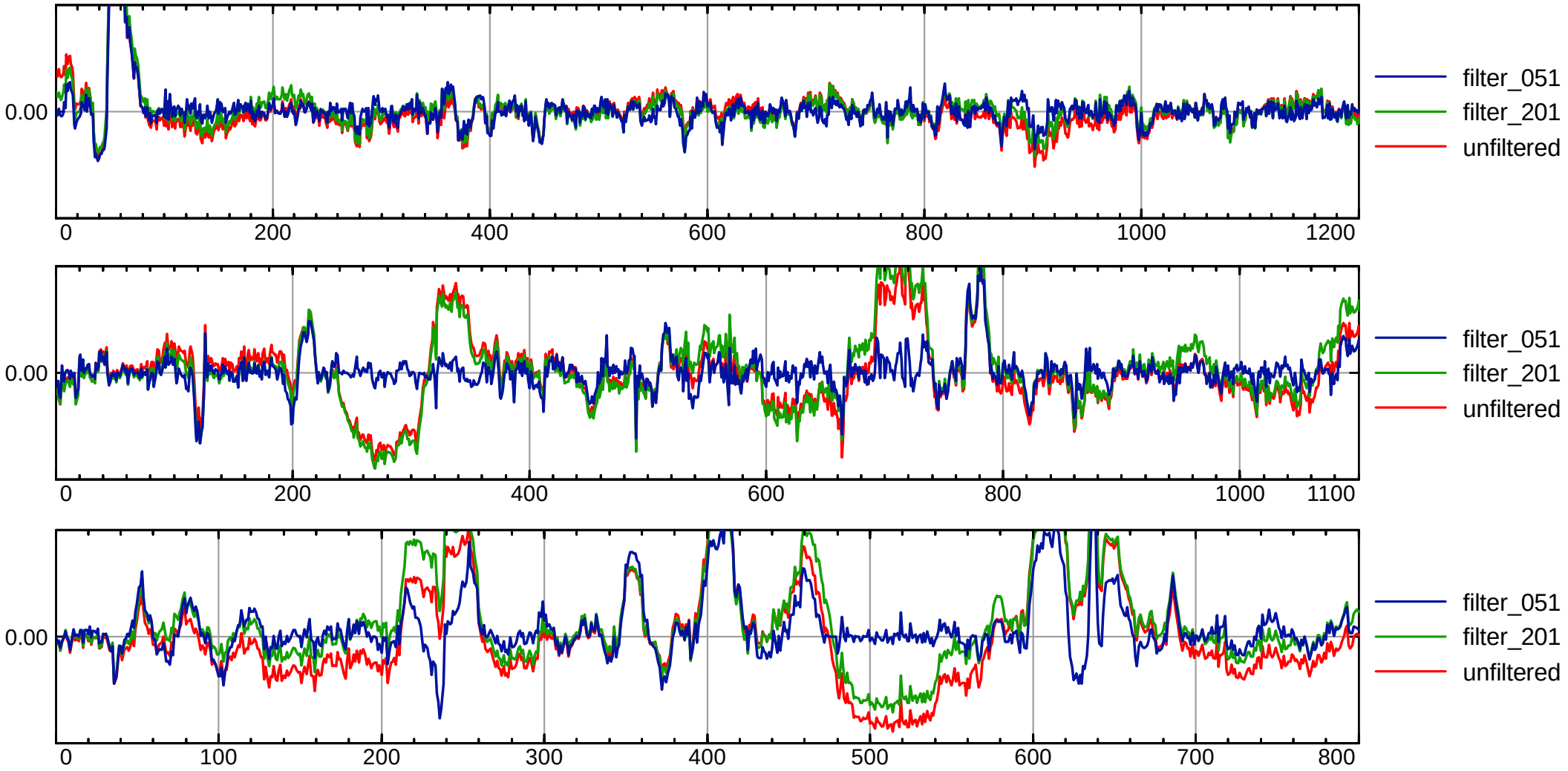
Sample Dataset

- Grids of various filters – 51pts, 201pts, raw



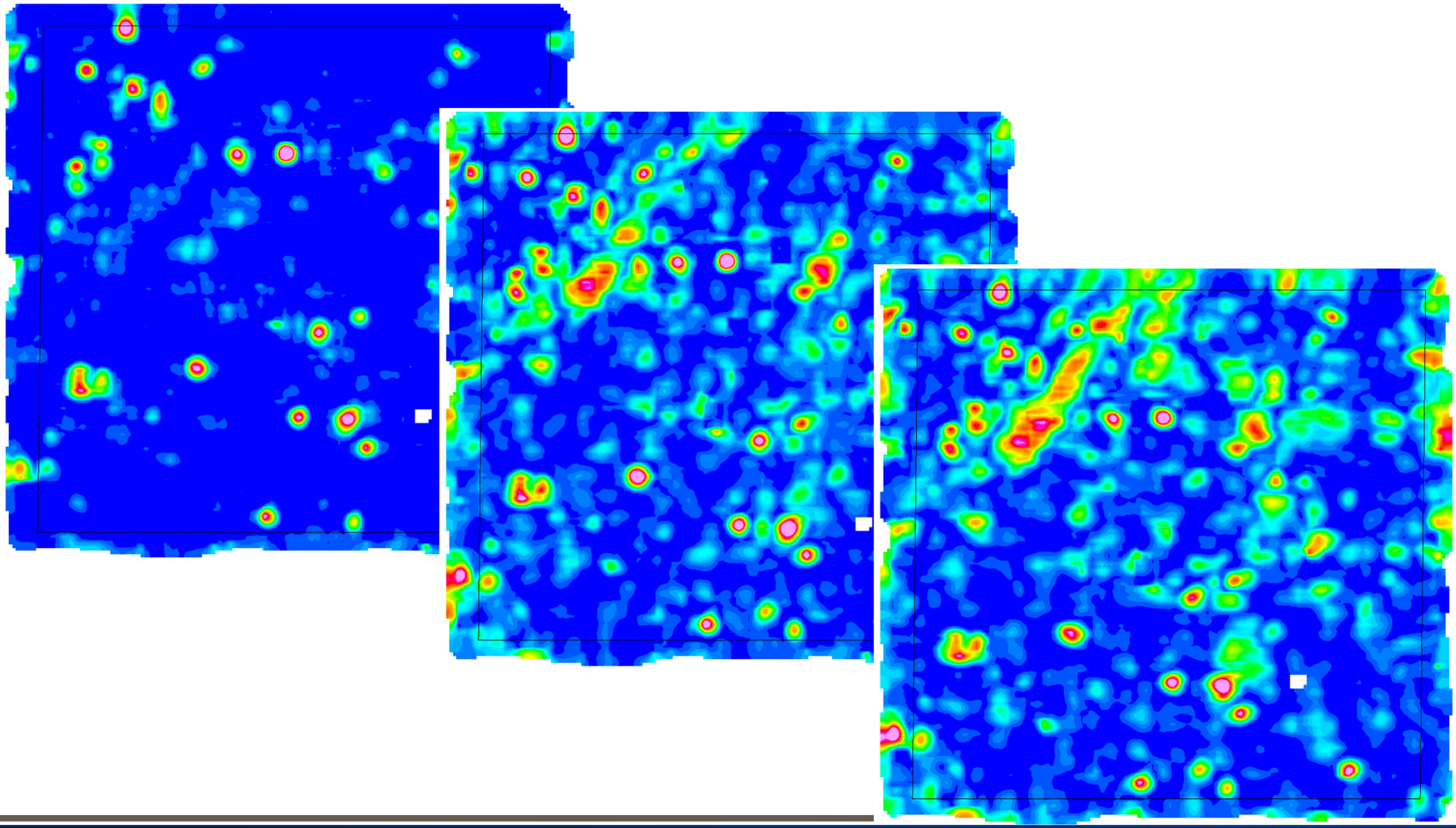
Filtered Profiles

- Profiles of various filters through three cross-sections of grid



Coherence Maps

- Negative anomalies create false coherence peaks



Target Selection

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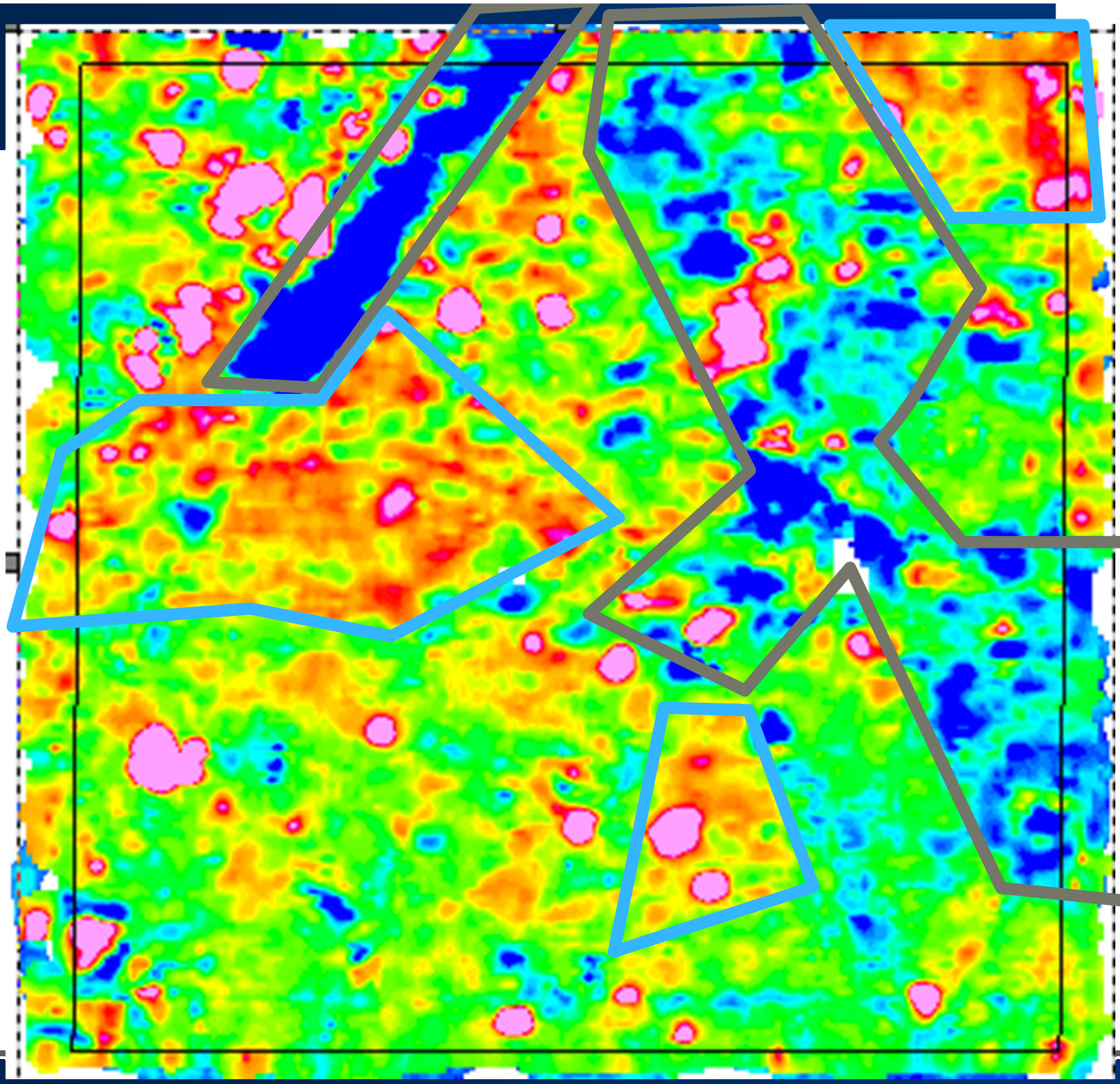
- Results of target selection based on different filters
- All versions detected all 3 seeds
- One-pass classification resulted in 62 flags
- Intrusive investigation found only 34 metallic sources (remainder were no-contacts due to geology)

Filter	Amp	Coh	Both	Total
Raw	194	0	4	195
3/1/201	168	1	7	176
3/1/051	95	1	9	105



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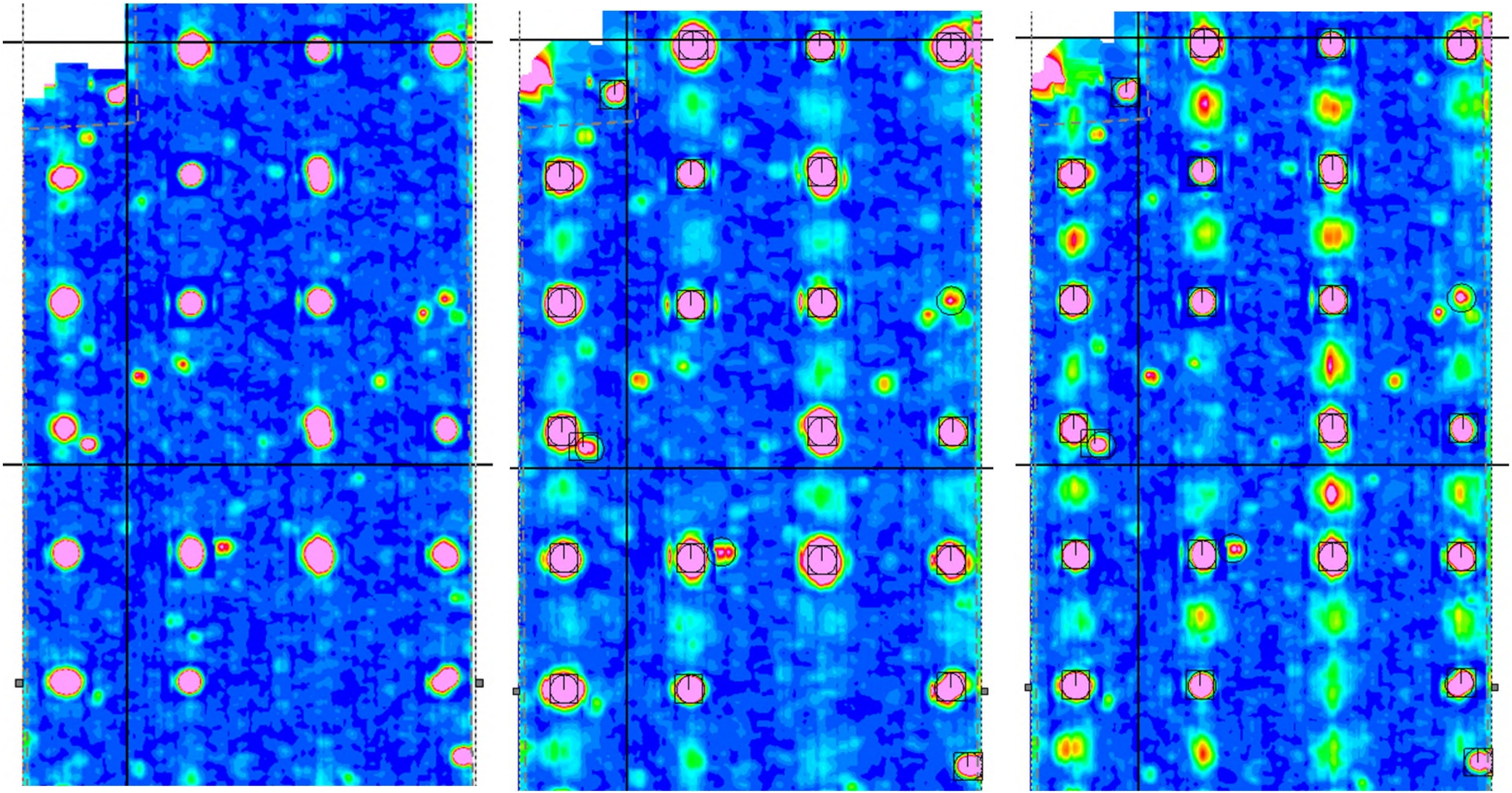
More Coherence Anomalies

- Even in benign geology, the wrong filter can create false coherence anomalies



Conclusions

- No real substitute for site knowledge and informed decision making.
- Filters may mask an underlying geologic problem.
- You don’t want to find your classification results are not matching the ground truth because the backgrounds are contaminated with geology that you didn’t know about.
- Start the processing with a map of raw data to see if there’s going to be a problem.
- Tailor your filters to your application and the site.
- Success may require more than one map.

Conclusions

- Questions?