

**TSX/PAZ Satellite Update**  
**InSAR Subsidence**  
July 30, 2023

Longquist comment:

The TSX satellite from the TSX/PAZ constellation (4 & 7-day revisit) passed by Sulphur on Sunday July 30. We received the dataset Tuesday and confirmed that the review areas that were showing upward movement have returned to trend. The attached time series plots have been prepared for reference.

We received a response from TREA asking about these deviations and how they can in some instances become smoothed out in subsequent datasets. Their response is below:

Typically, the small jumps (up or down) in the last image of the time series may be a result of atmospheric effects. In order to optimally compensate for the atmospheric residual, our algorithm utilizes the 2 previous images and the 2 following images for each point in the time series (when a new image is acquired). In the case you mentioned, the atmospheric residual is compensated using only the 2 prior images for the last image in the time series. So, the reason we see the trend stabilize over time is that the algorithm is utilizing the 2 succeeding images.

This confirms that a certain amount of re-interpretation of the data is occurring on recent measurements. We also have a bit more context on the relative confidence in new data for future evaluations.



# TSX/PAZ Constellation Update

## Continuous InSAR Monitoring of Ground Displacement Near Western Caverns and Dome Flank

Sulphur Dome  
Westlake Chemicals

July 30, 2023 Update



Date Signed: August 1, 2023  
Austin, TX

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PETROLEUM  
ENGINEERS

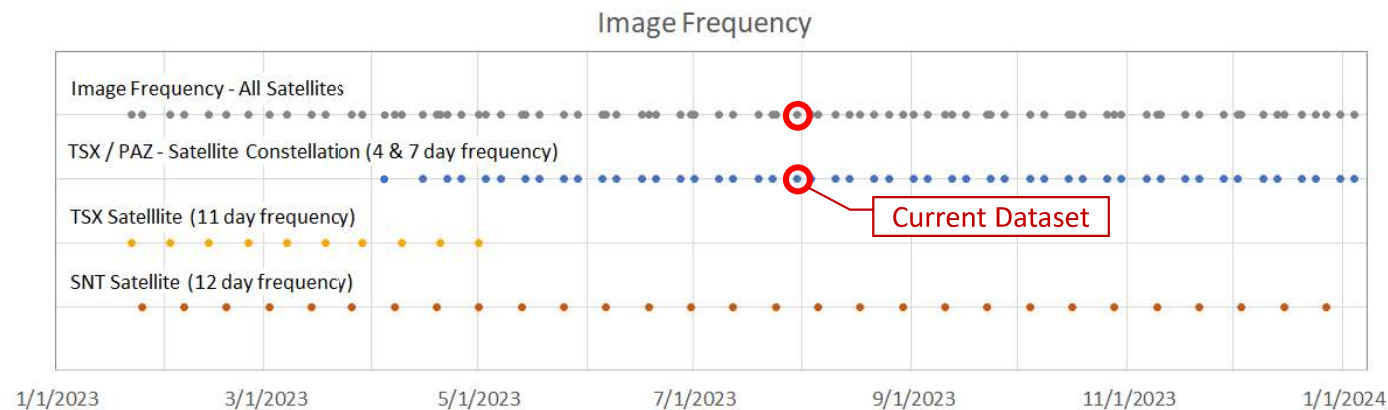
ENERGY  
ADVISORS

# Parameters of InSAR Dataset and Collection Frequency

## • Satellite Data Delivery Frequency as of April 2023:

- Sentinel 1 (SNT)  
12 days
- TSX / PAZ Constellation  
4 & 7 days
- 3.96-day avg. frequency

	Sentinel-1	TerraSAR-X	TSX/PAZ Constellation	
			TerraSAR-X	PAZ
Mode / Resolution	16 x 65 ft	Spotlight (3 x 3 ft)	Spotlight (3 x 3 ft)	Spotlight (3 x 3 ft)
Track	T136	T29	T67	T120
Band (wavelength)	C-Band (2.32 in)	X-Band (1.22 in)	X-Band (1.22 in)	X-Band (1.22 in)
Nominal frequency	12- day	11- day	11- day	11- day
Orbit (LOS angle)	Ascending 43°	Descending 17°	Descending 37°	Descending 37°
Date range	04 Oct 2016 – 20 Jan 2024	16 Jun 2022 – 01 May 2023	24 Jan 2023 – 11 Jan 2024	28 Jan 2023 – 15 Jan 2024
Number of images	199	30	34	33

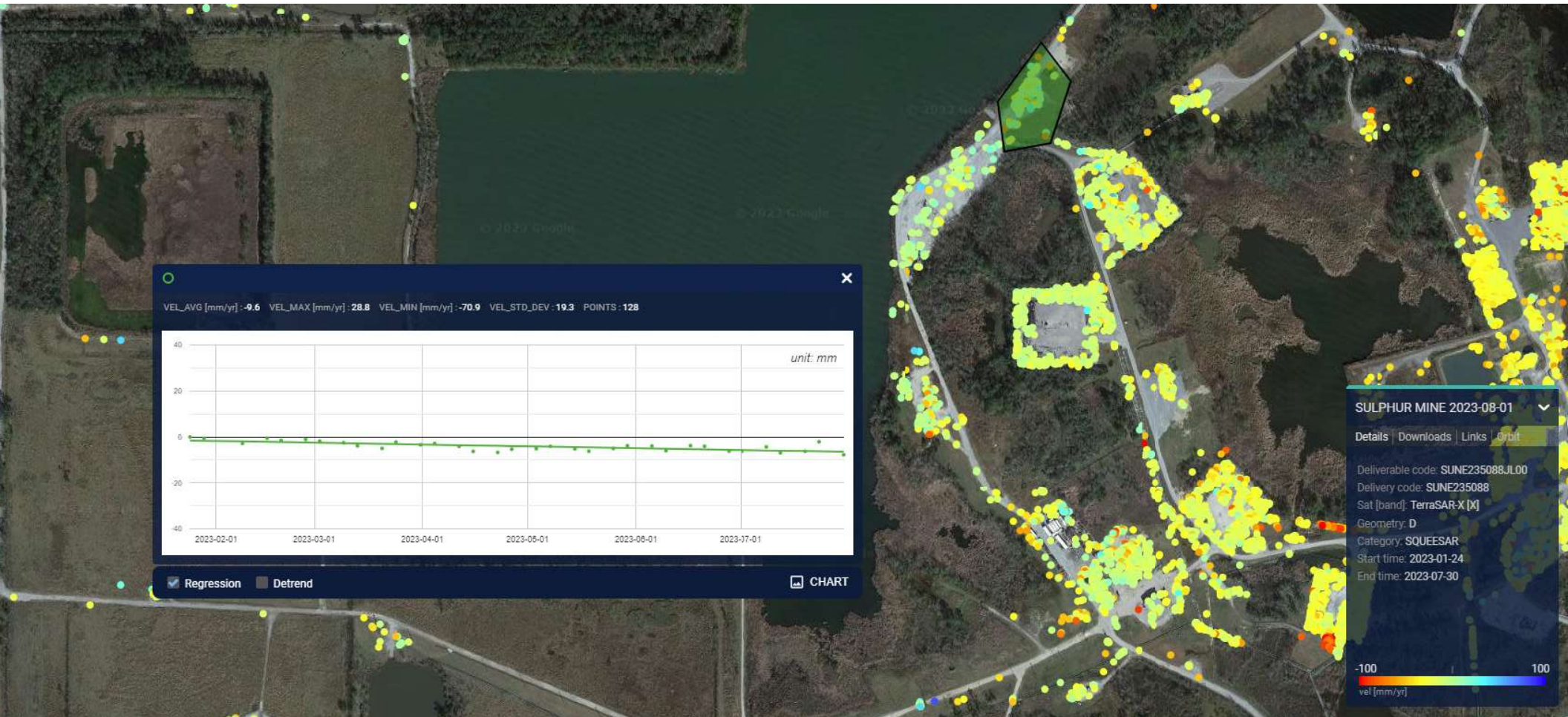


## Overview and Monitoring History

- Beginning in late January, ground displacement over the western portion of the Sulphur Mines Salt Dome has been evaluated following the delivery of each dataset update from TRE-Altamira
- An automated process and set of deliverables to convey the results of the datasets is being developed that will evaluate multiple factors including trend consistency and mapped acceleration of ground displacement
- Current updates are focused on the review of time series charts of averaged data for selections of points around the dome and caverns on the western flank
- The TSX/PAZ satellite constellation (4 & 7-day revisit) passed by Sulphur on Sunday July 30, 2023
- The following slides present the time series and associated linear trends for each location evaluated from this dataset
- To-date there has been no material deviation from the established subsidence trends in the areas investigated

# TSX/PAZ Constellation – July 30, 2023 Update

# PPG 21



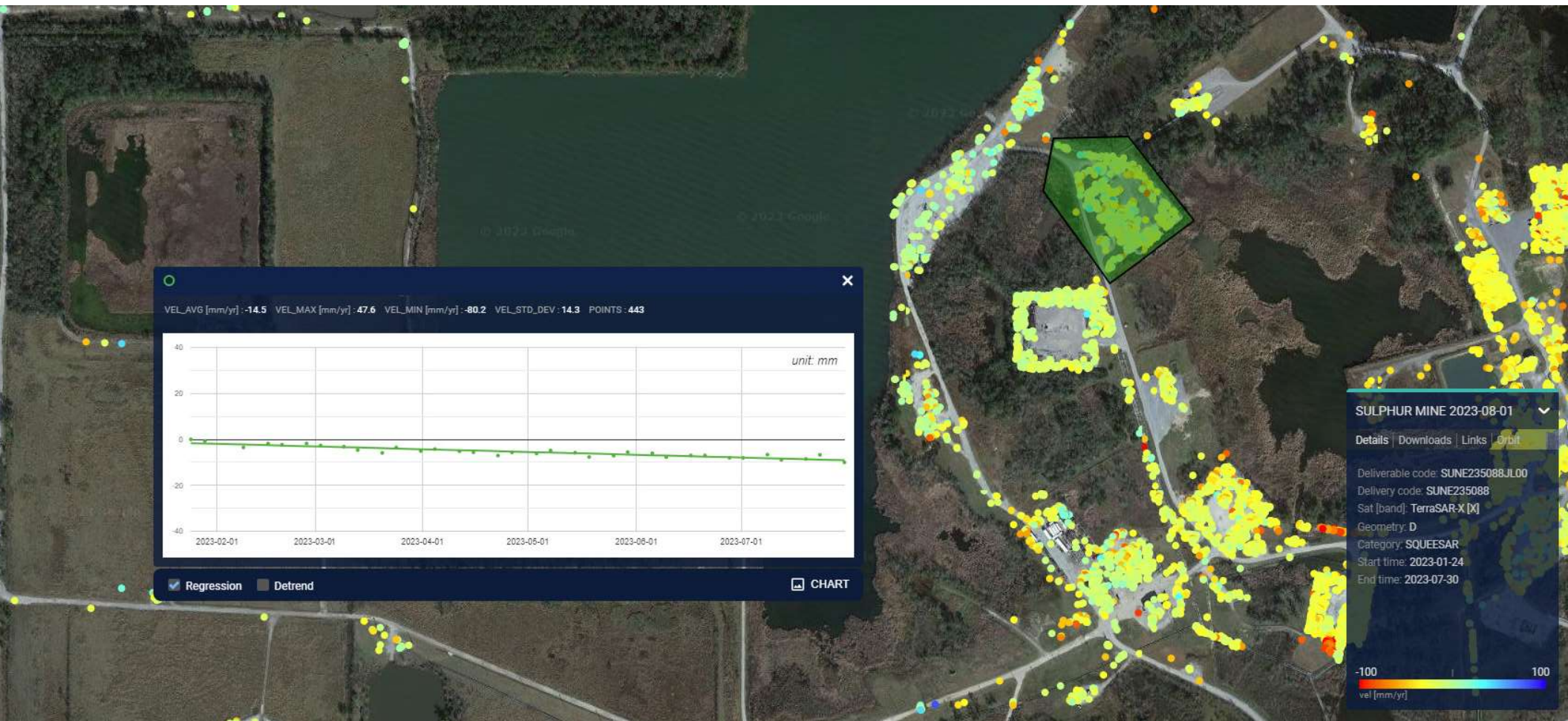
8/1/2023

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# PPG 6

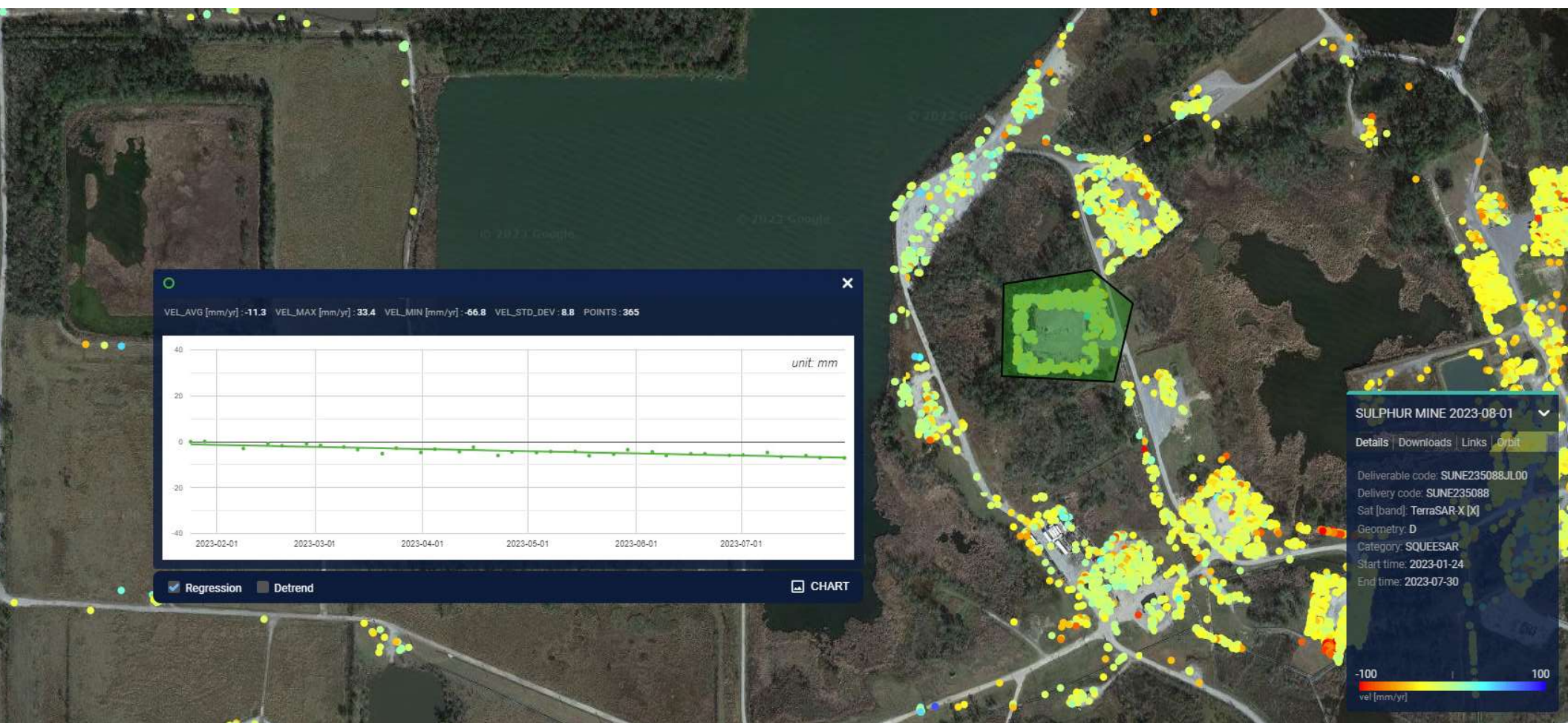


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## PPG 7



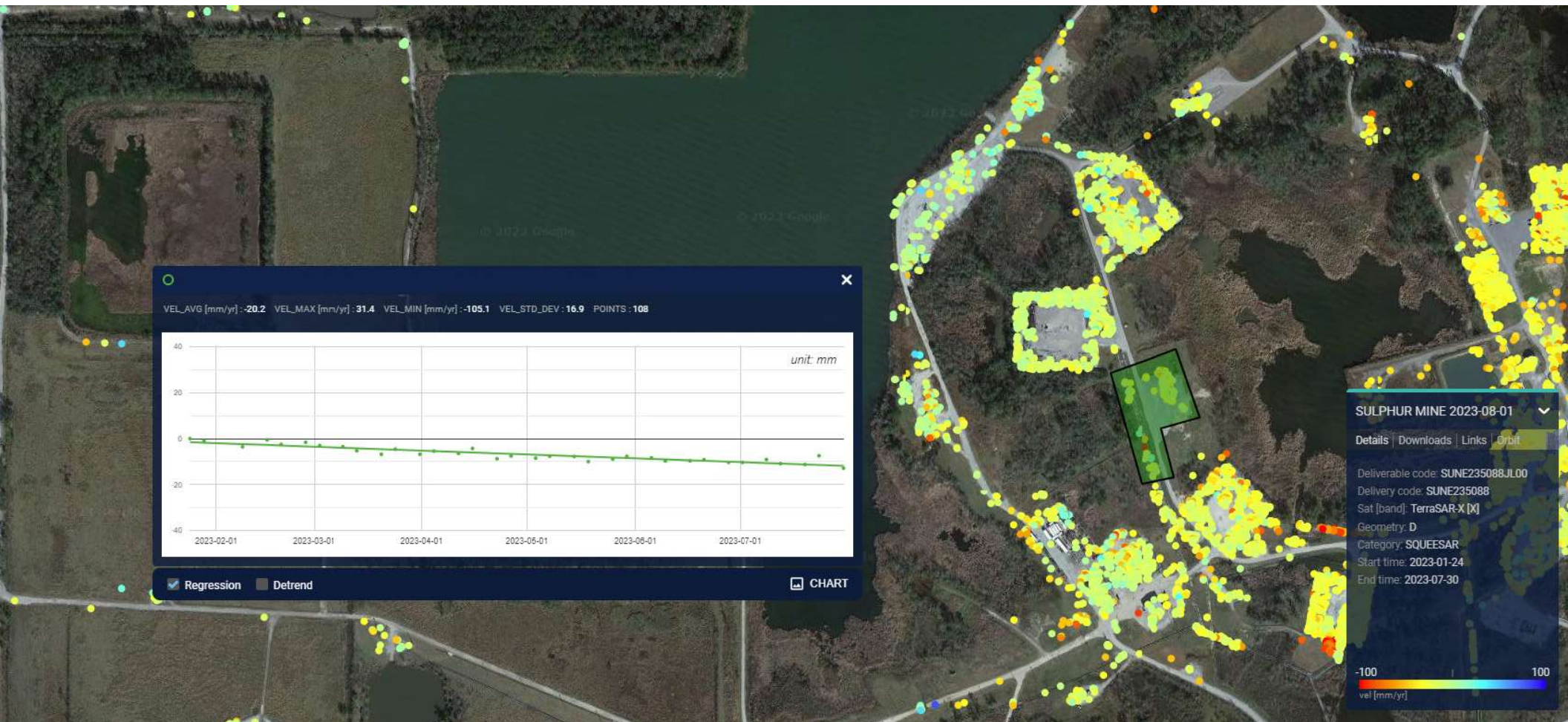
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# PPG 22



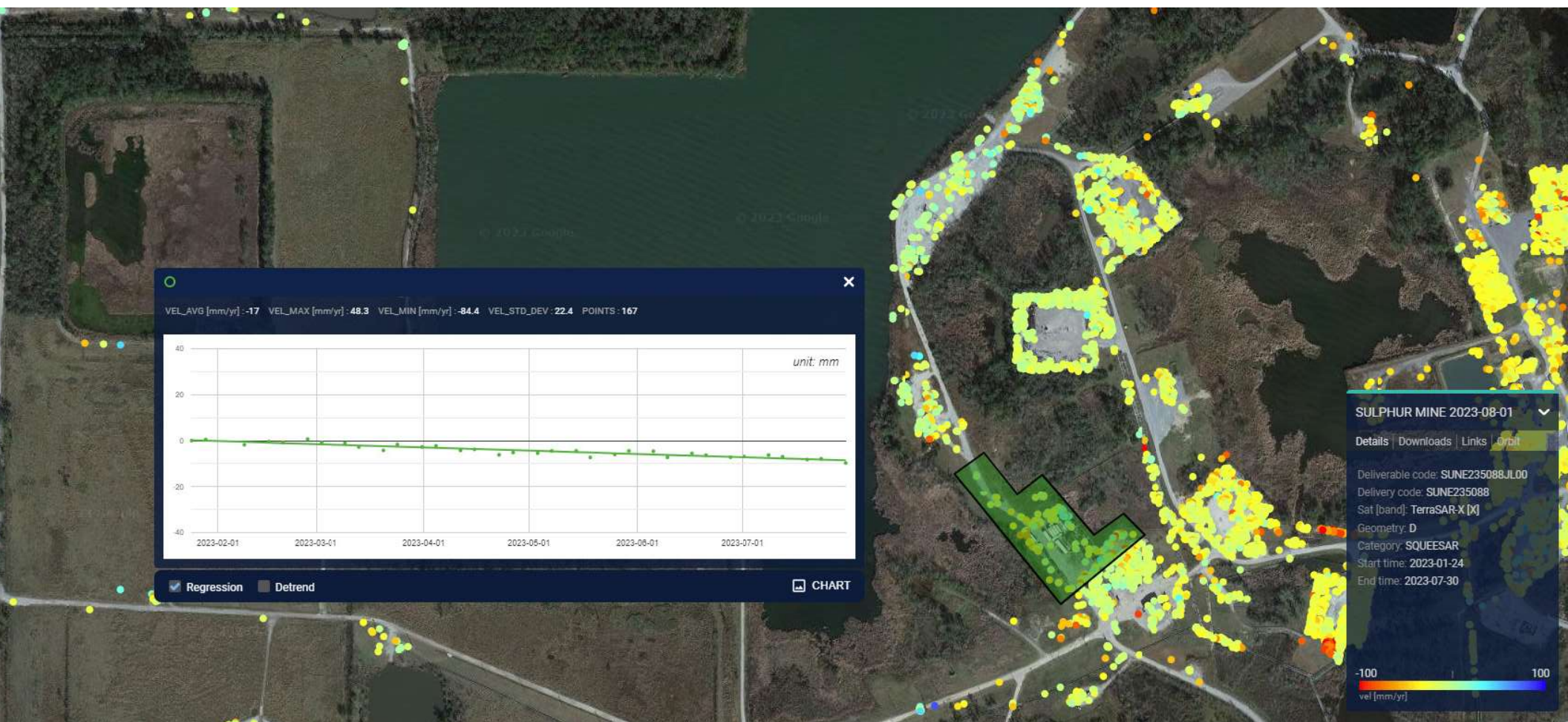
8/1/2023

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## AOI #1



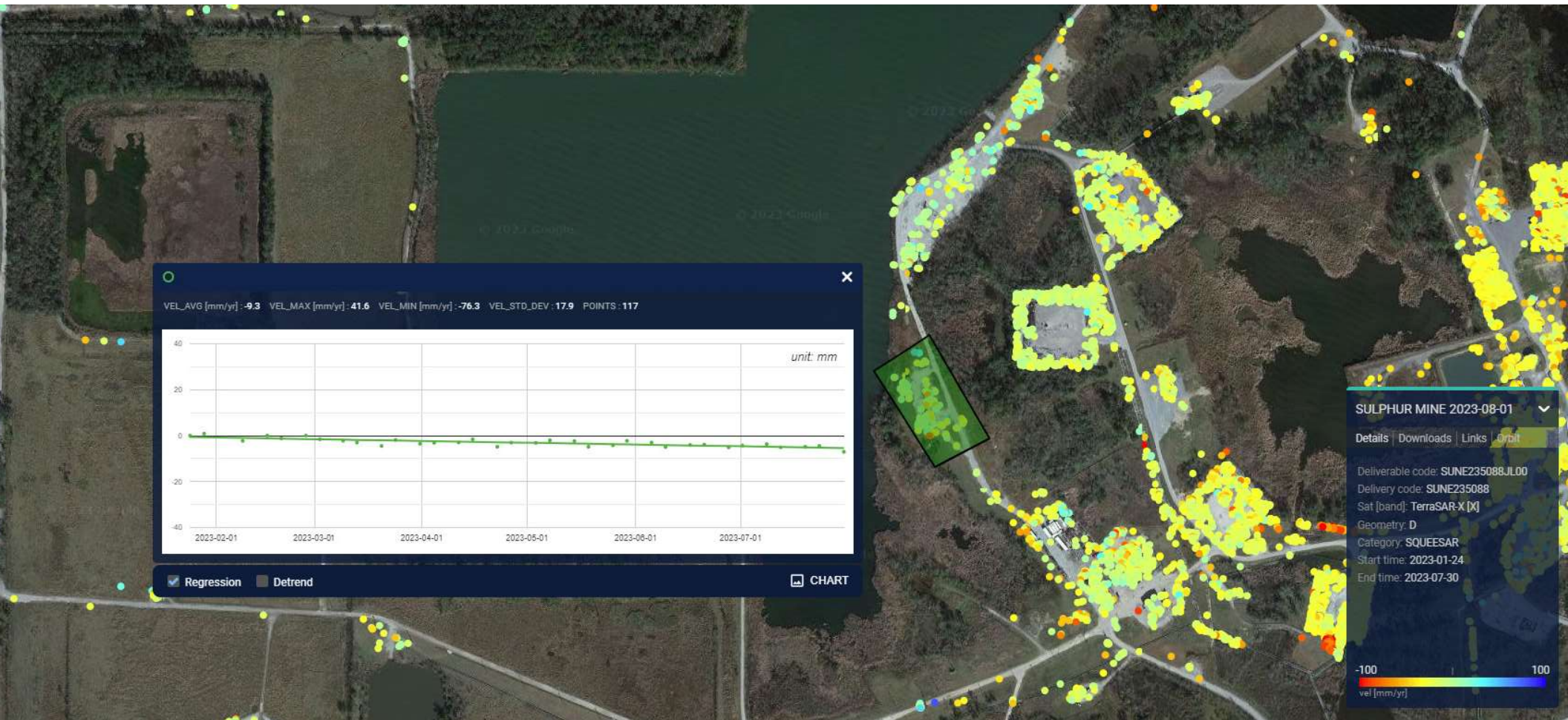
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# AOI #2



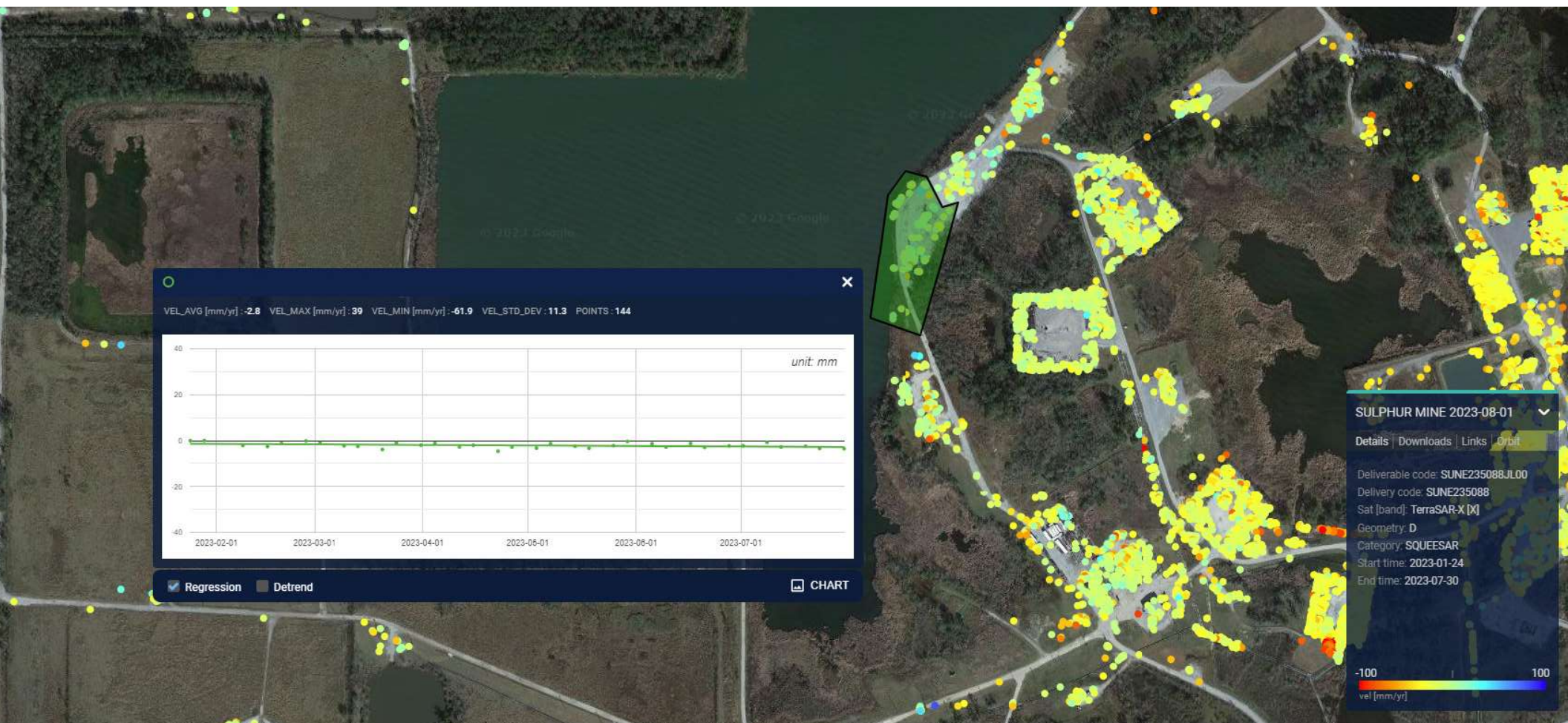
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# AOI #3



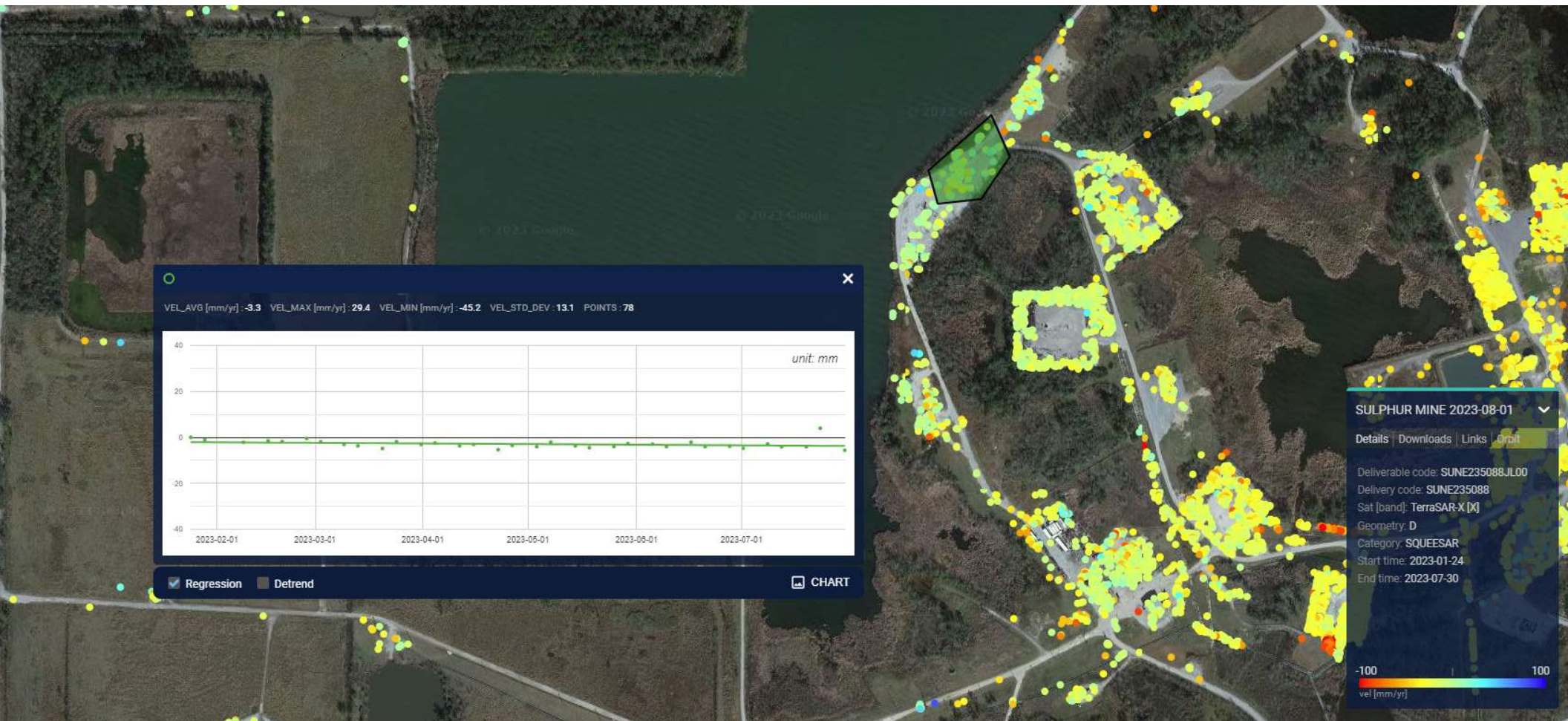
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# AOI #4



8/1/2023

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