

Westlake US 2
6/24/2023

TSX/PAZ Satellite Update
InSAR Subsidence
June 20, 2023

Lonquist comment:

The PAZ satellite from the TSX/PAZ constellation (4 & 7-day revisit) passed by Sulphur on Tuesday June 20. We received the dataset Thursday and verified that none of the datapoint areas around the dome and caverns near the western flank are showing deviation from their linear trend. The attached time series plots have been prepared for reference.

Submitted by: Nathaniel Byars (Lonquist)



TSX/PAZ Constellation Update

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

Sulphur Dome
Westlake Chemicals

June 20, 2023 Update



Date Signed: June 23, 2023
Austin, TX

Nathaniel L. Byars, P.E.
Principal Engineer
Louisiana License No. 40697

LONQUIST & CO. LLC

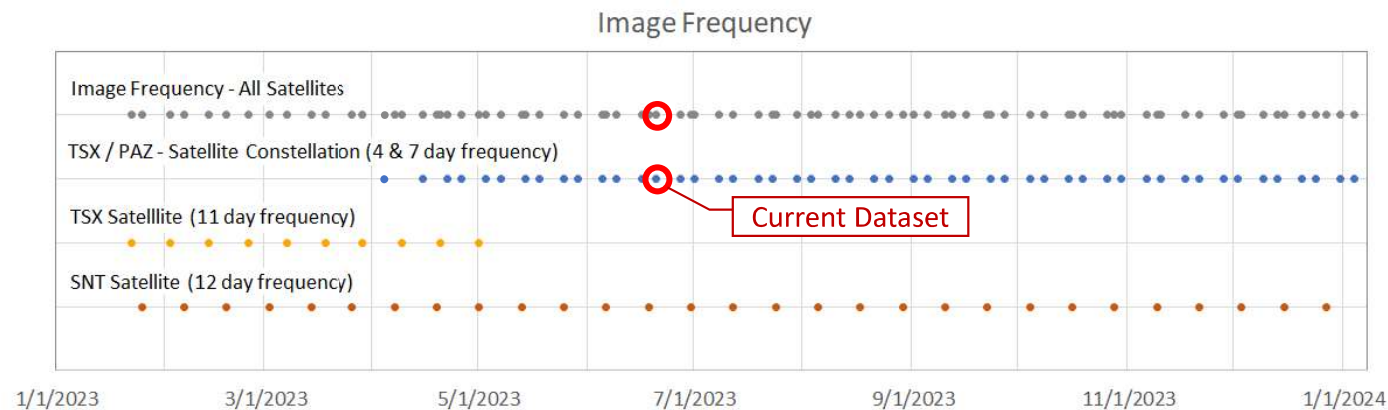
PETROLEUM
ENGINEERS

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 Tuesday June 20, 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 – June 20, 2023 Update

PPG 21



6/23/2023

Continuous Monitoring of Ground Subsidence

PPG 6

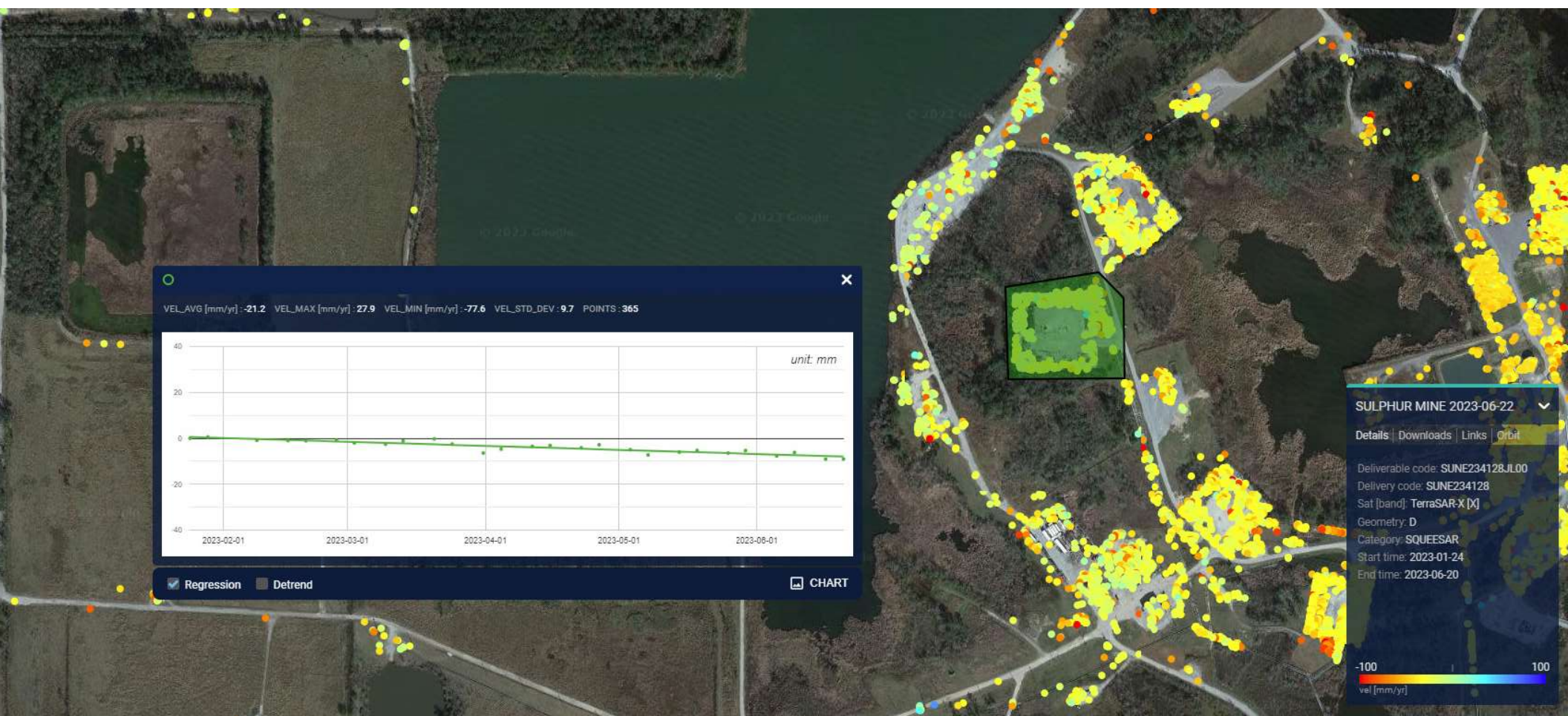


6/23/2023

Continuous Monitoring of Ground Subsidence

6

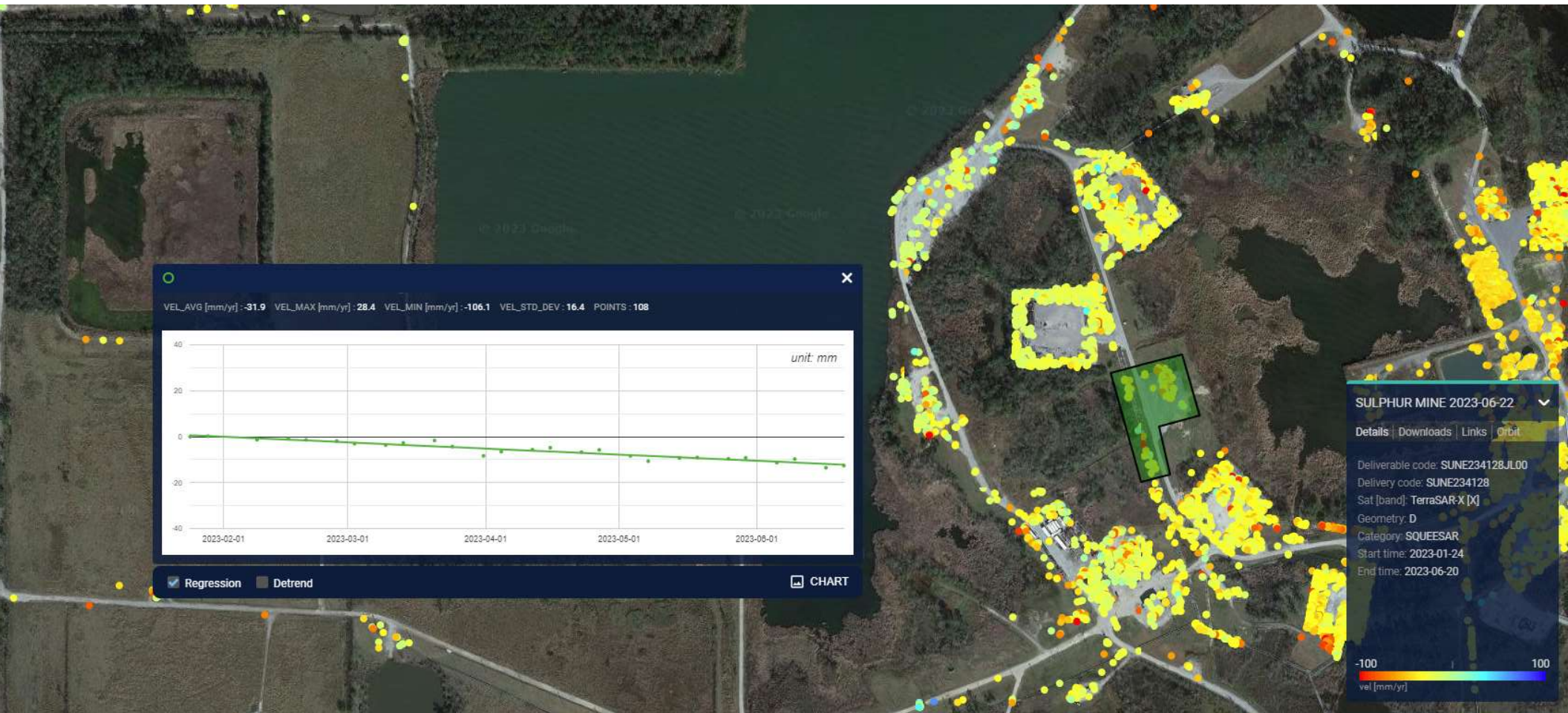
PPG 7



6/23/2023

Continuous Monitoring of Ground Subsidence

PPG 22



6/23/2023

Continuous Monitoring of Ground Subsidence

8

AOI #1



6/23/2023

Continuous Monitoring of Ground Subsidence

9

AOI #2



6/23/2023

Continuous Monitoring of Ground Subsidence

10

AOI #3



6/23/2023

Continuous Monitoring of Ground Subsidence

AOI #4



6/23/2023

Continuous Monitoring of Ground Subsidence

12