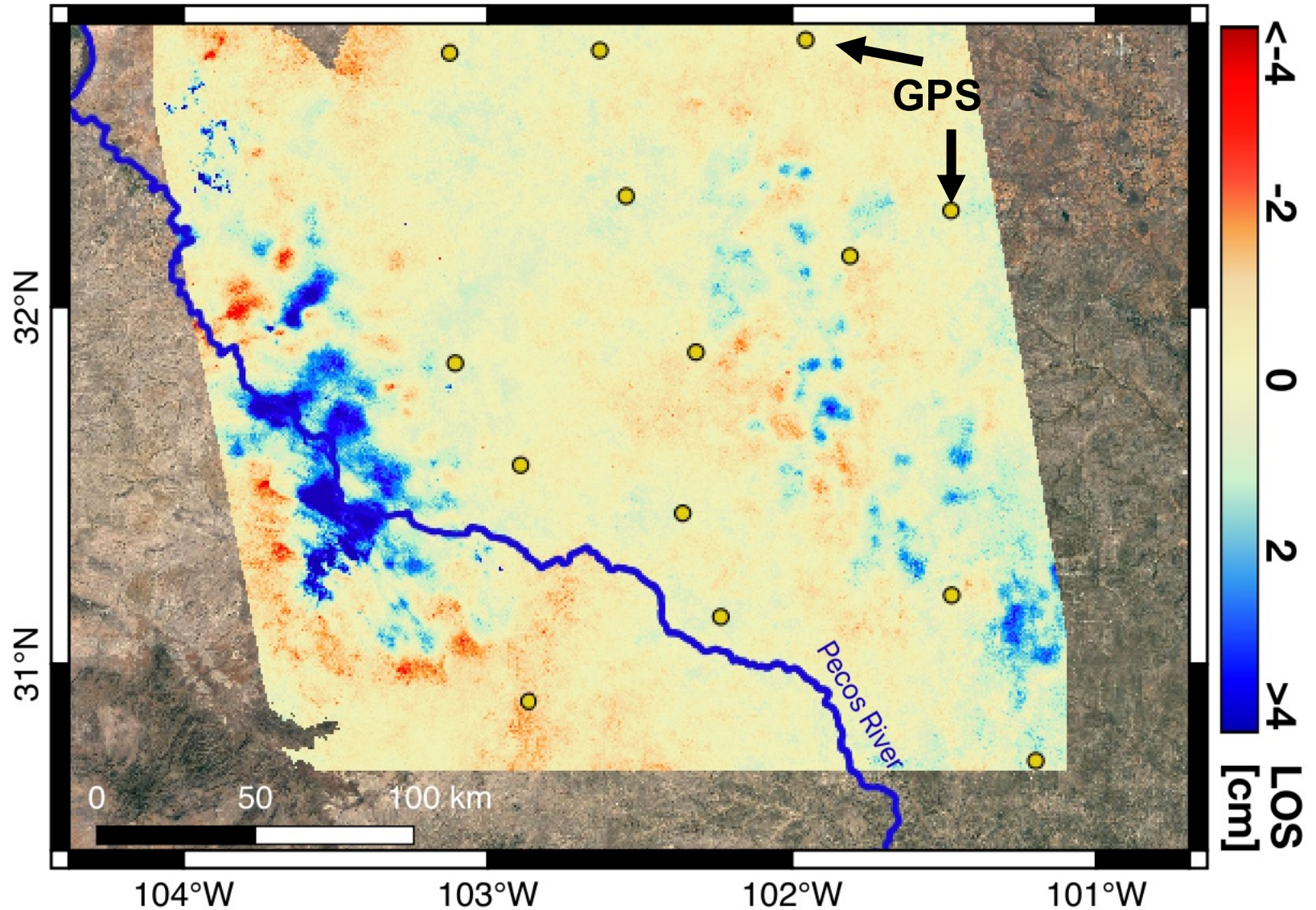# Quantifying the Probability of False Alarm for Automatically Detected Features in InSAR Deformation Maps

Scott Staniewicz, Jingyi Chen
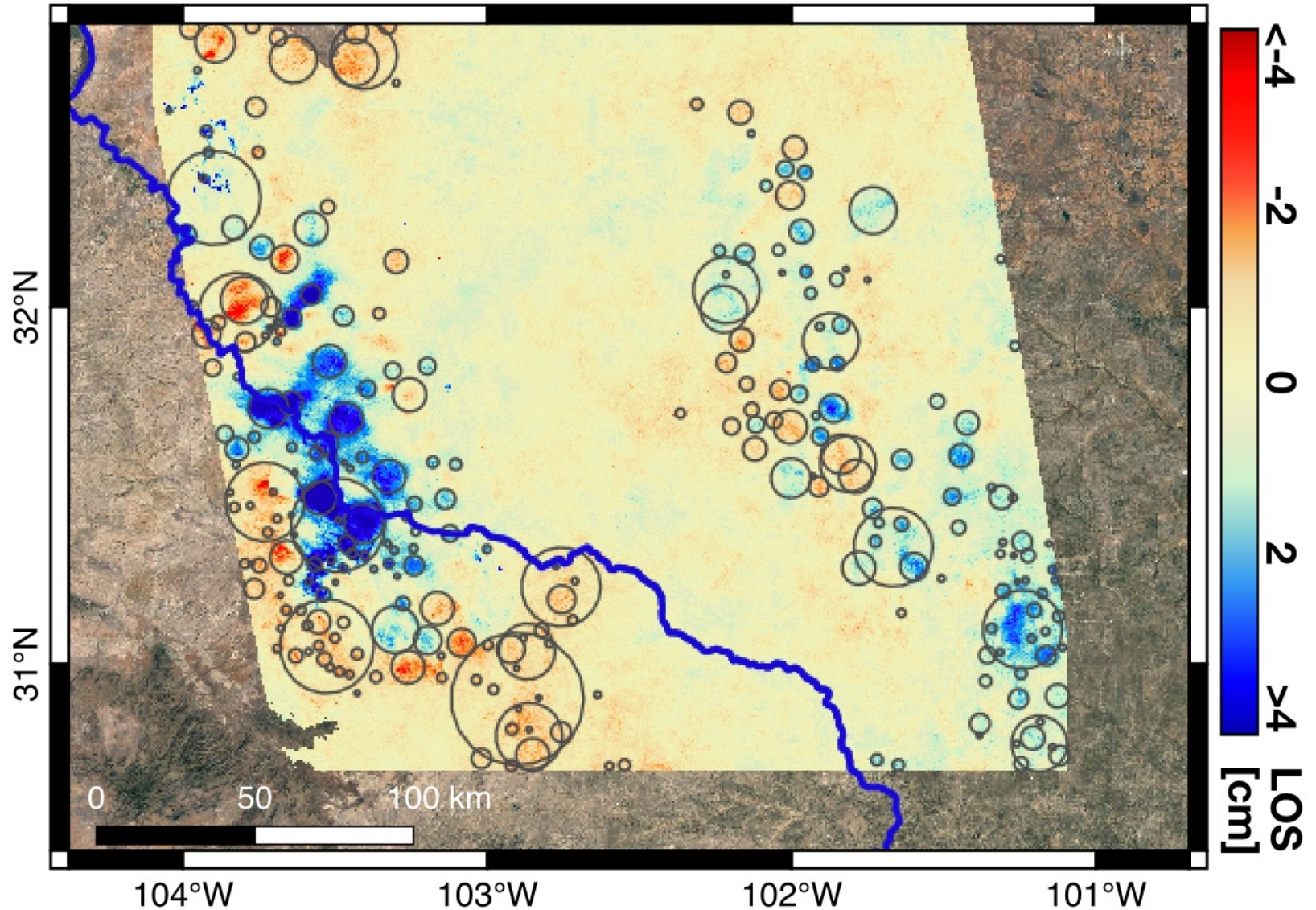
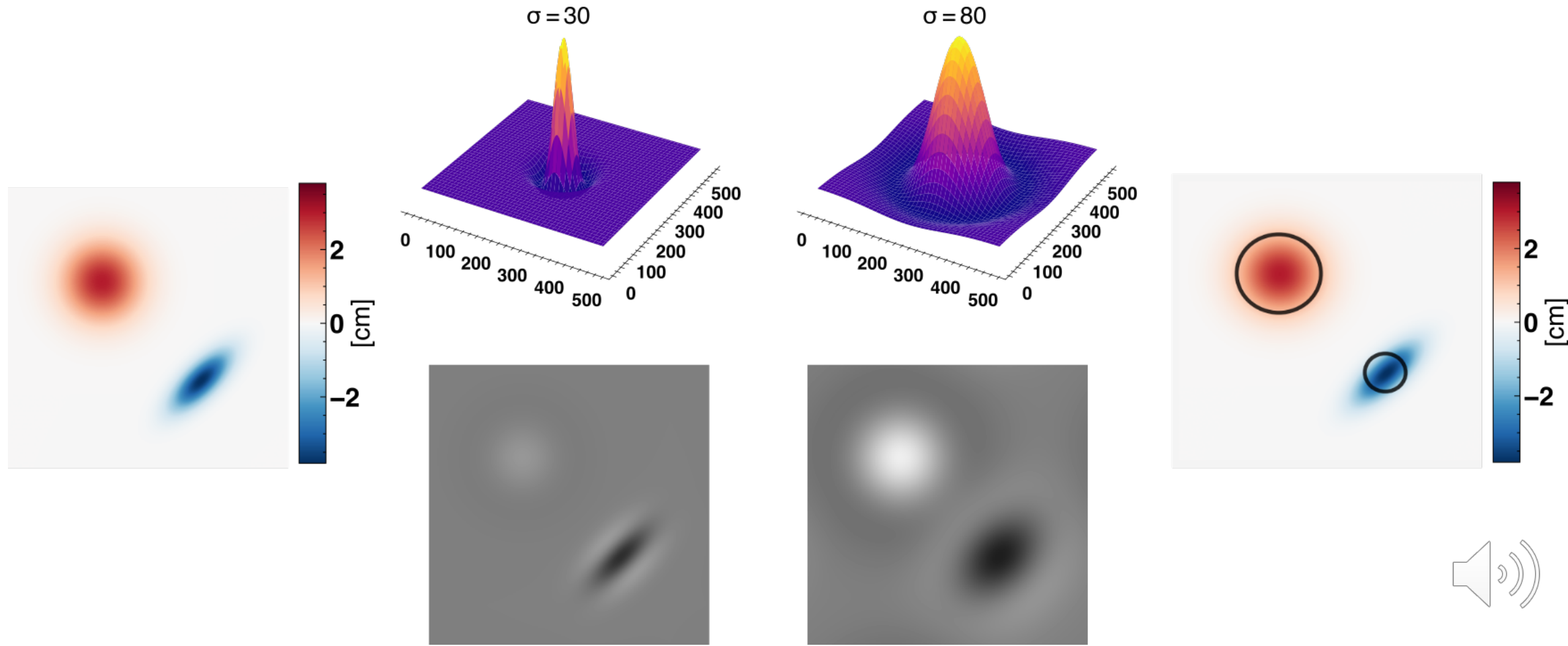# Cumulative deformation: Nov.'14 - Jan '19

Permian Basin,
West Texas

Automatic detections: p < 0.01
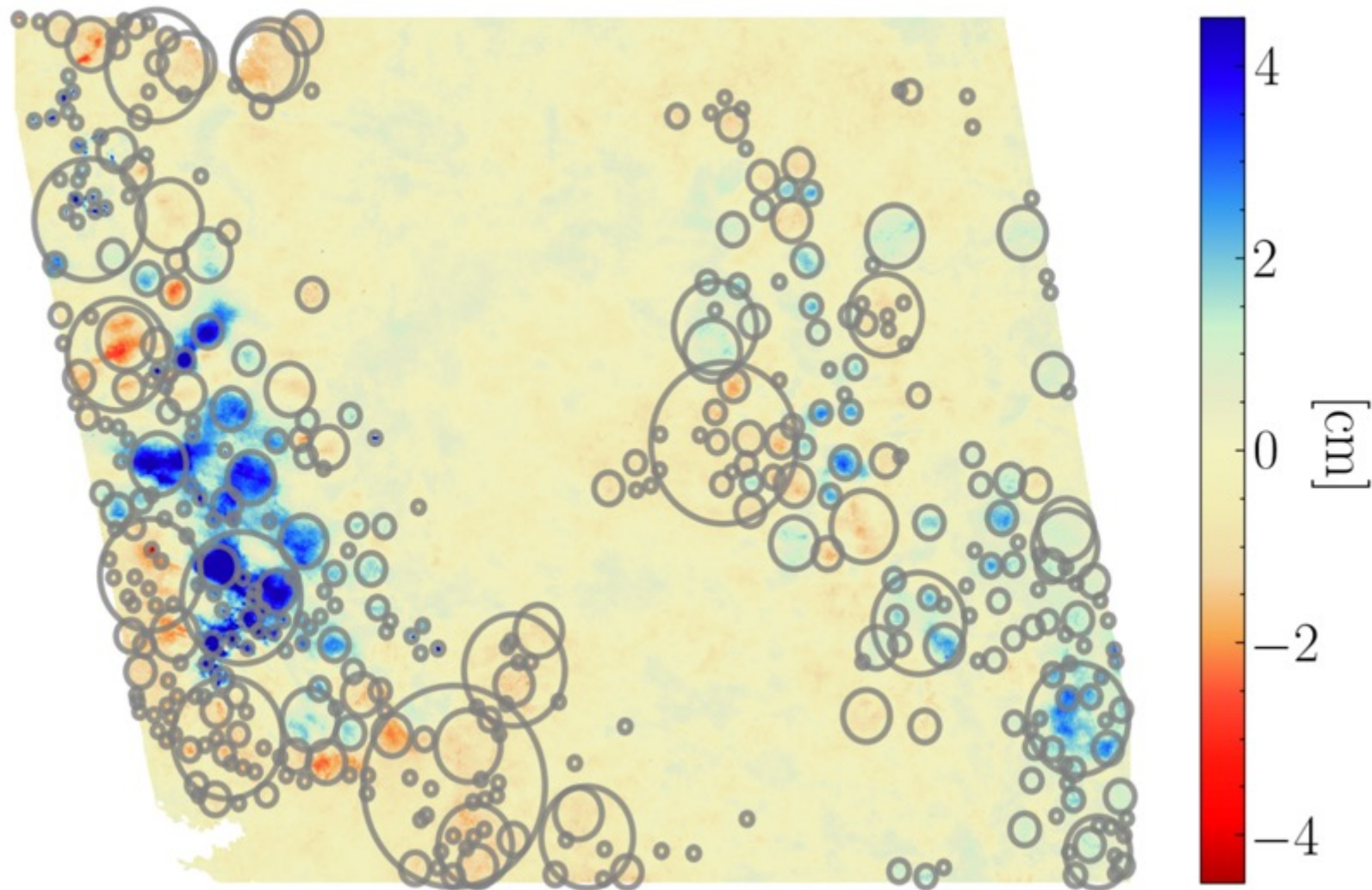
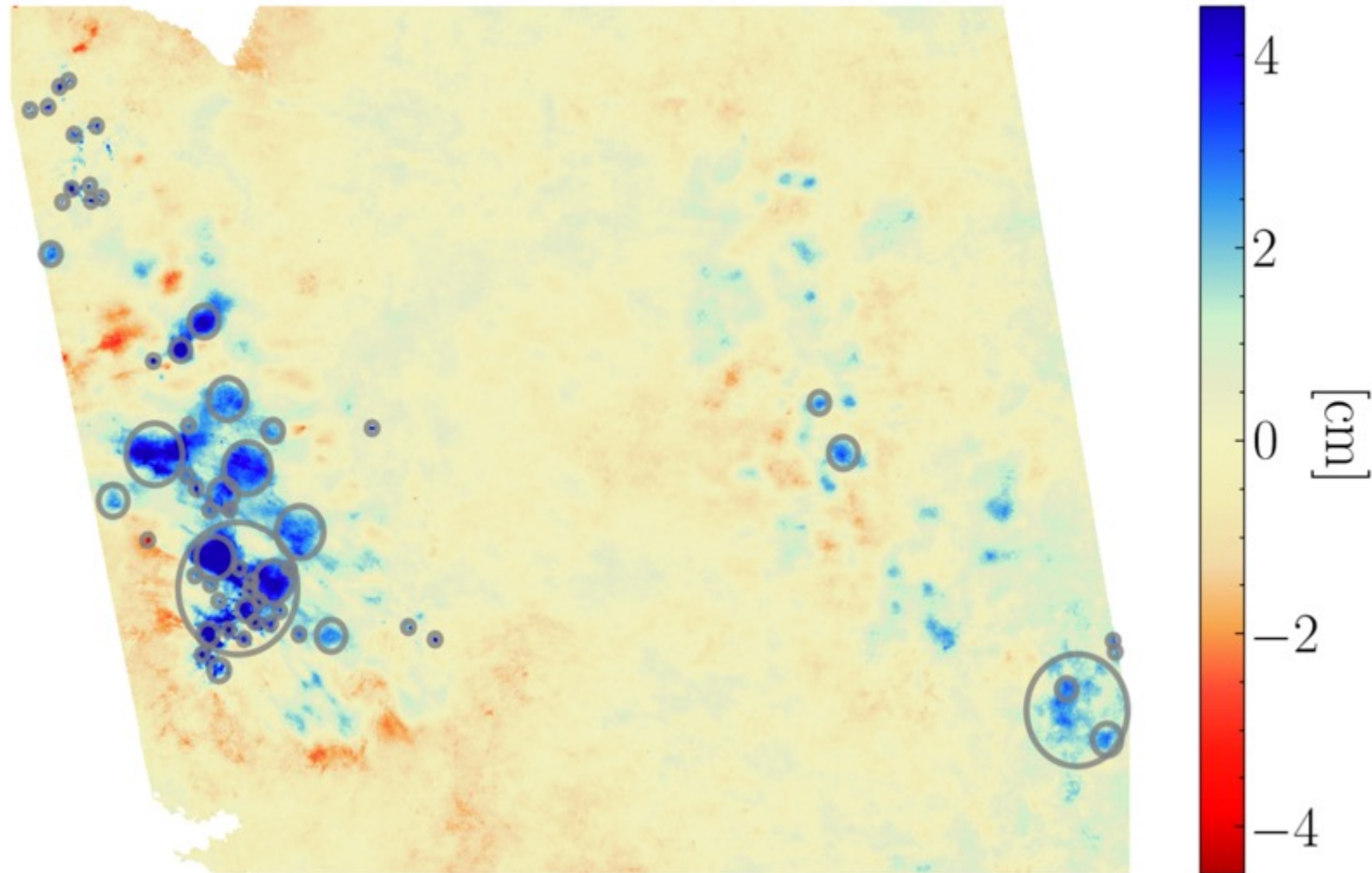Permian Basin,
West Texas

LoG filtering for blob detection

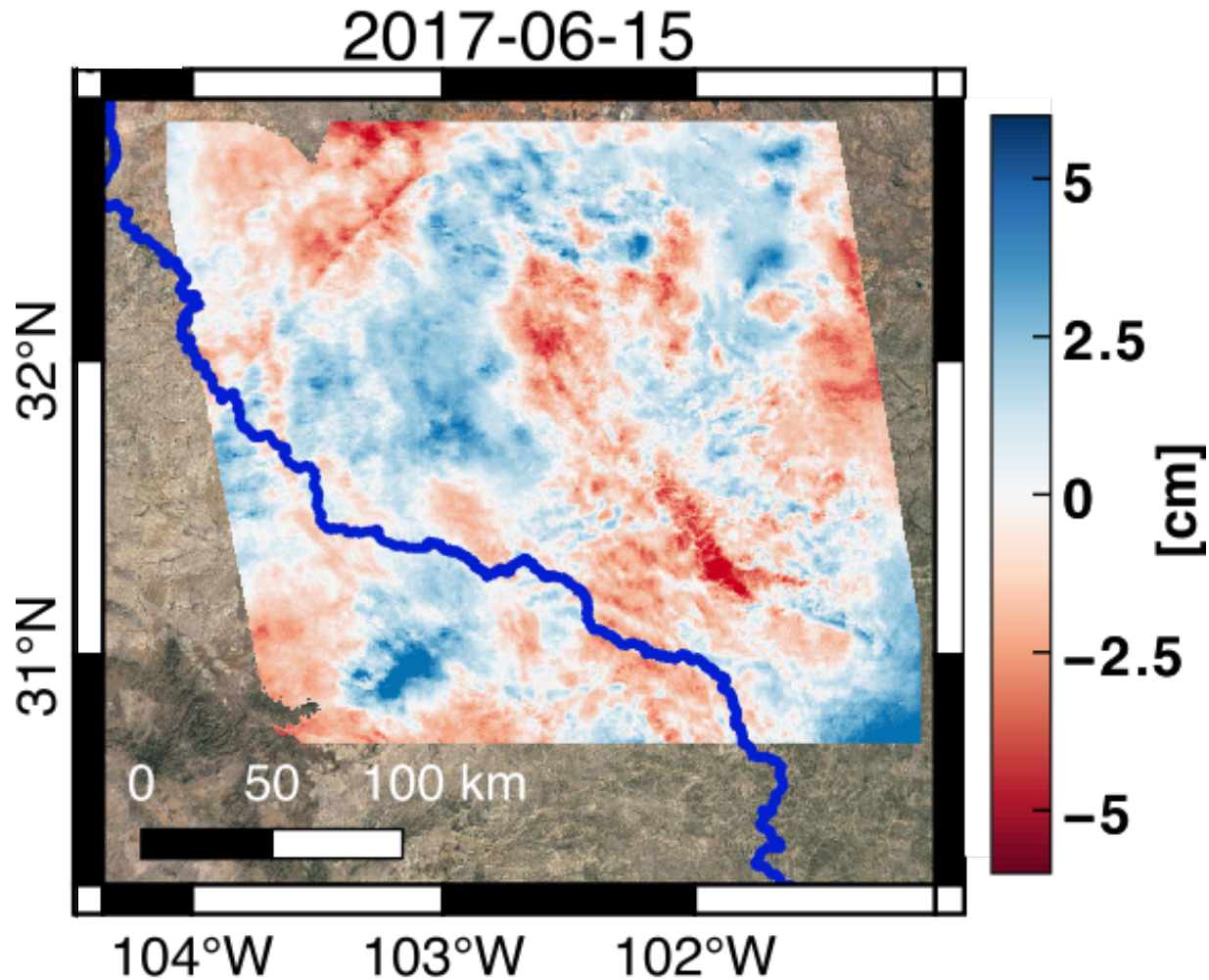# Detection Threshold?

Too low threshold -> False Alarms
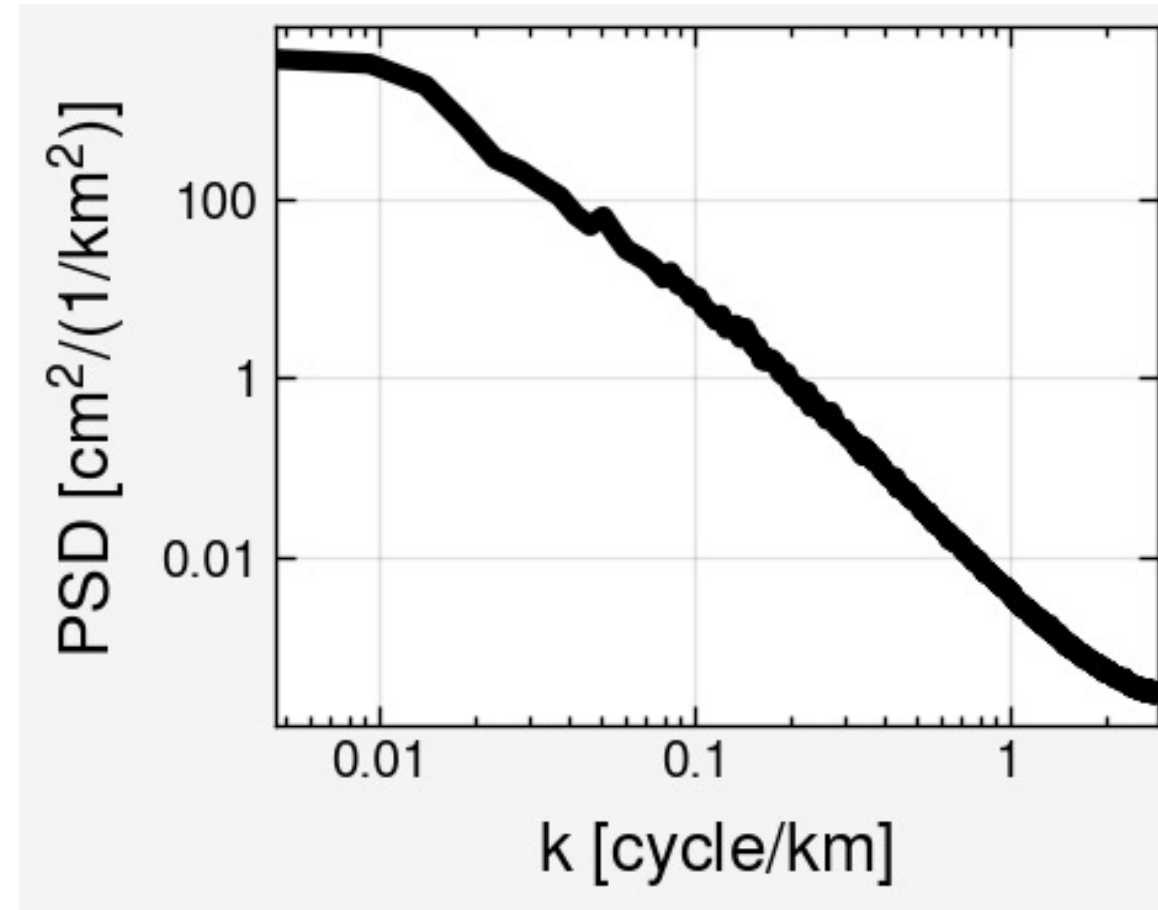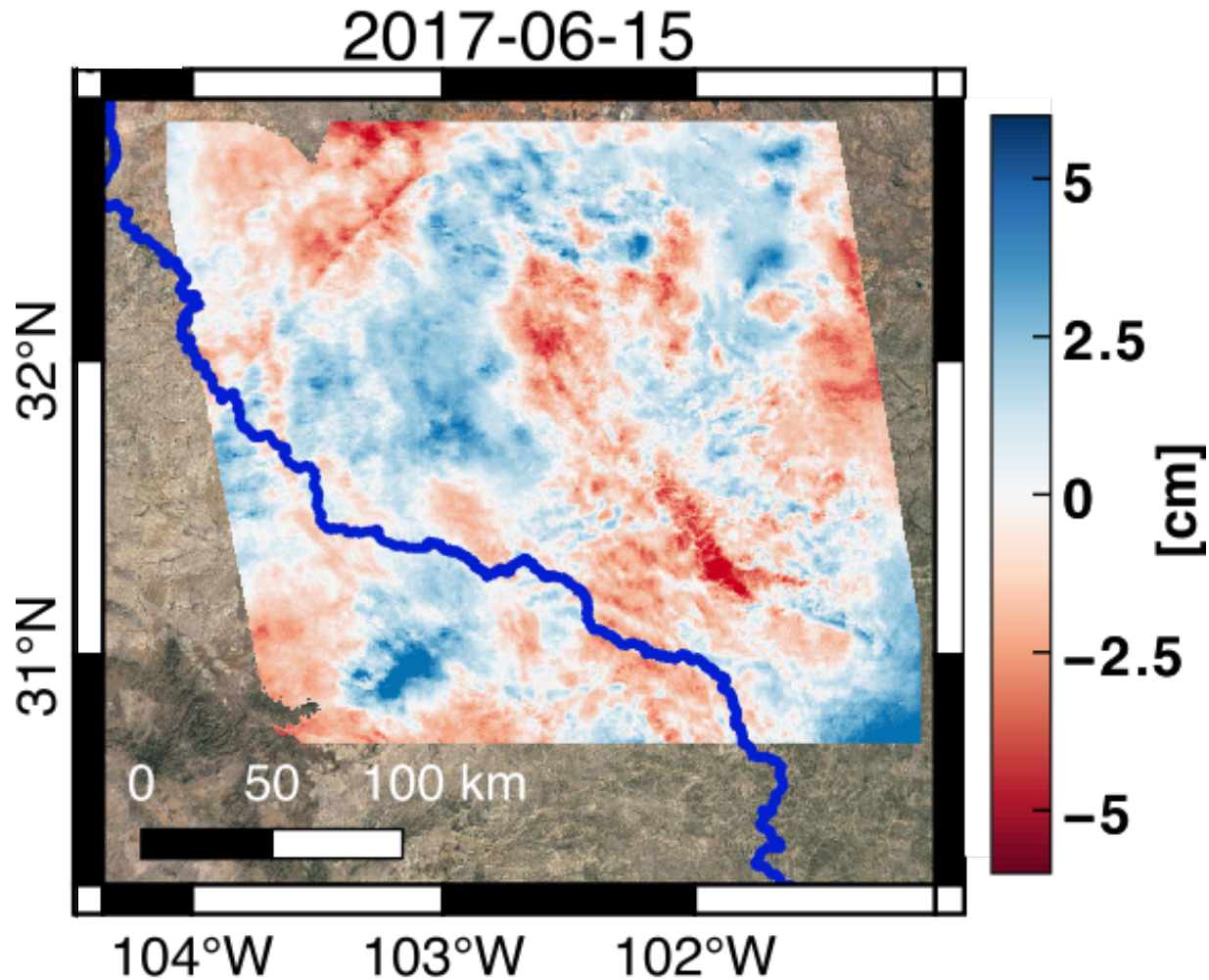
Detection Threshold?

Too high threshold -> Misses
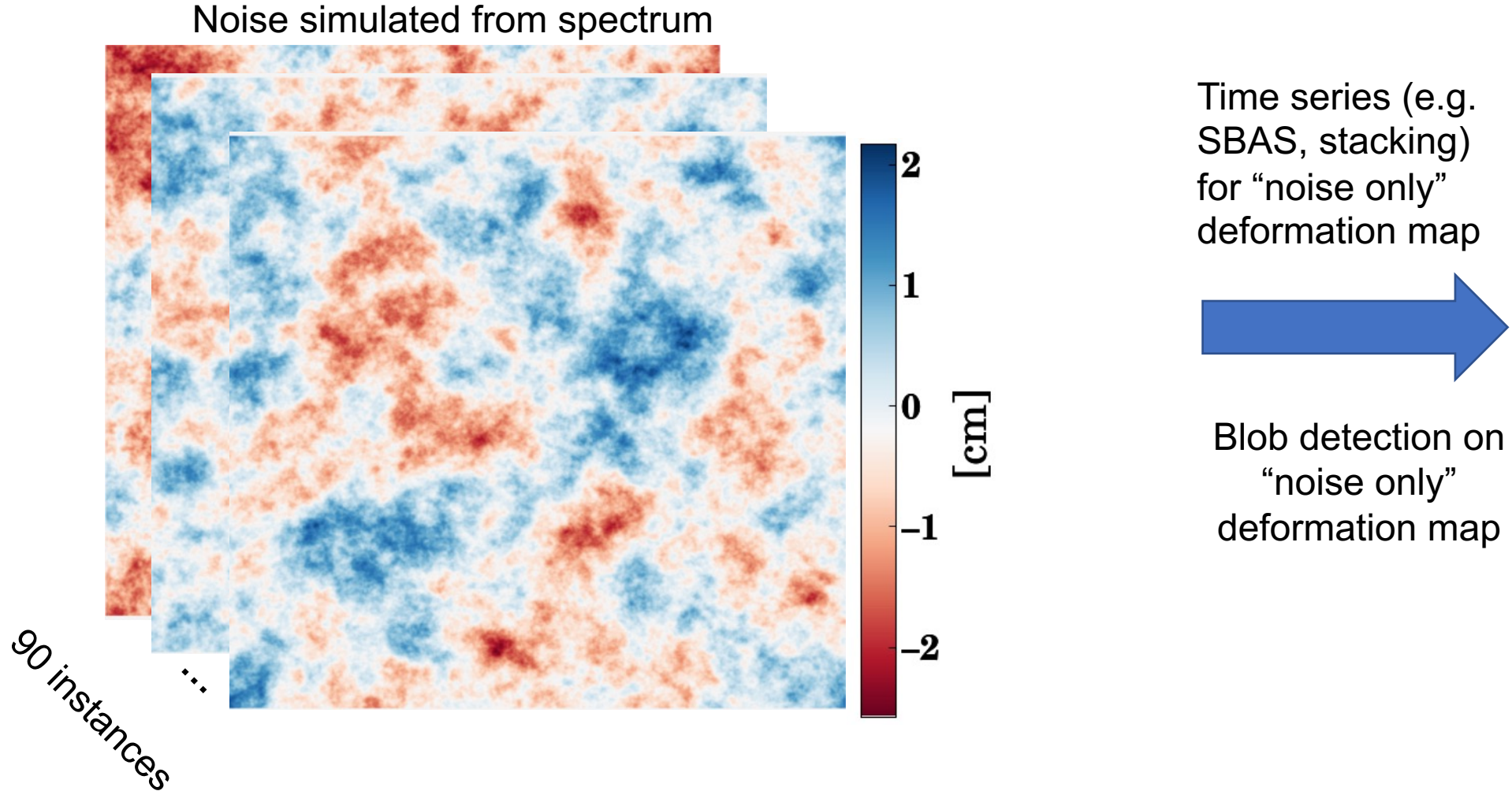
Characterize tropospheric turbulence

2017-06-15

$$\bar{\alpha}_n = \frac{\lambda}{4\pi} \frac{1}{N-1} \left(\sum_{k=1,k\neq n}^{N} \phi_{n,k} \right)$$
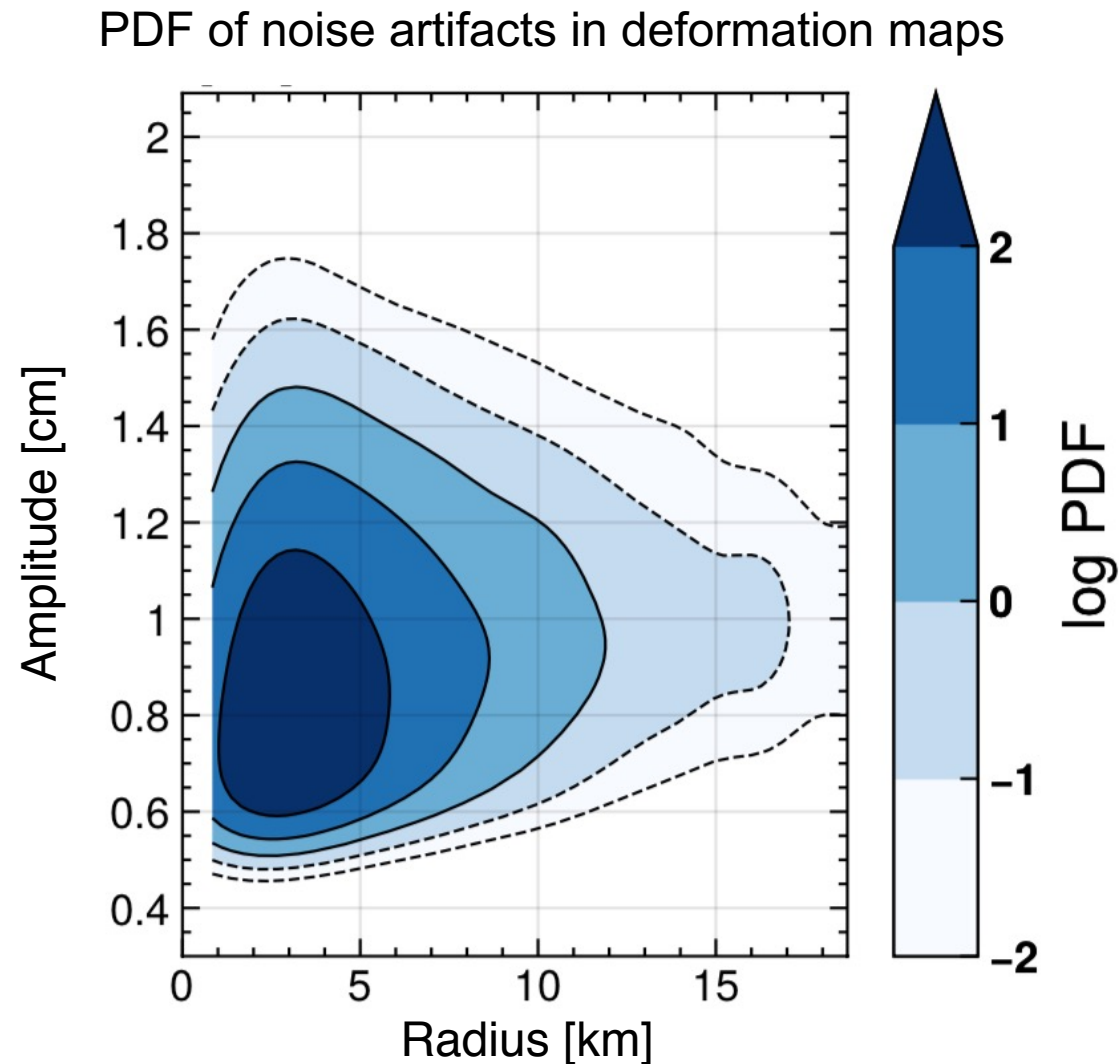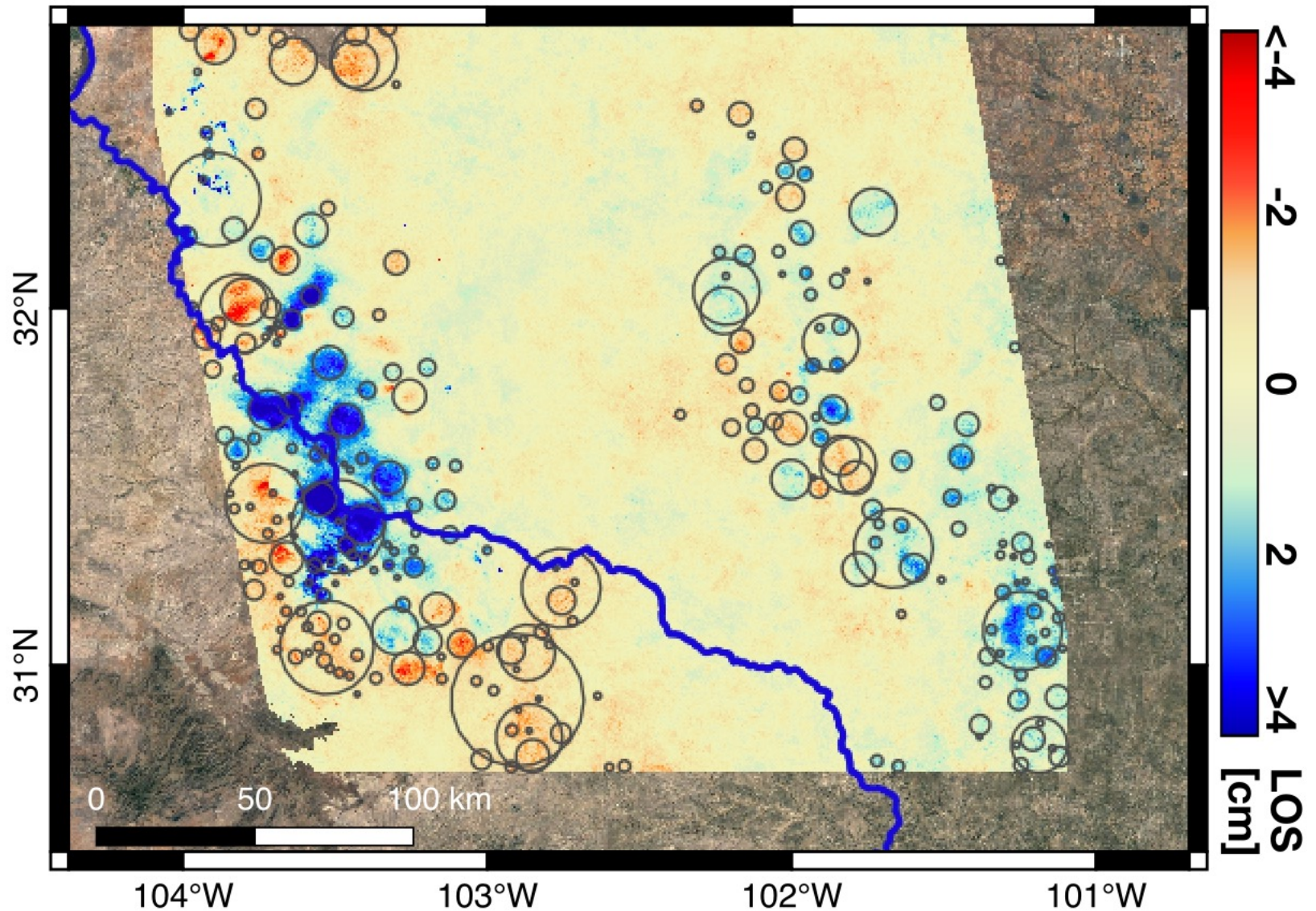
Characterize tropospheric turbulence

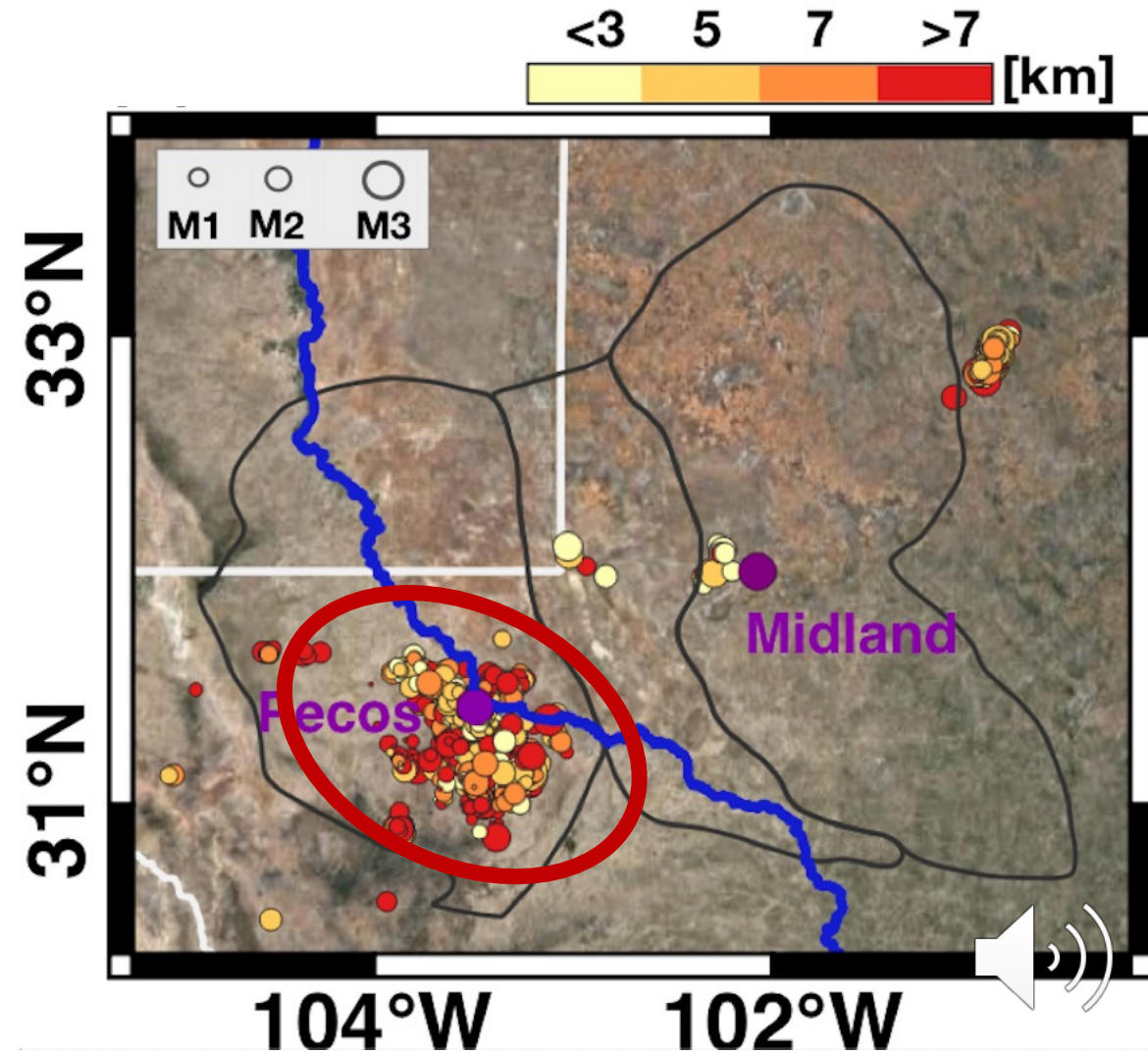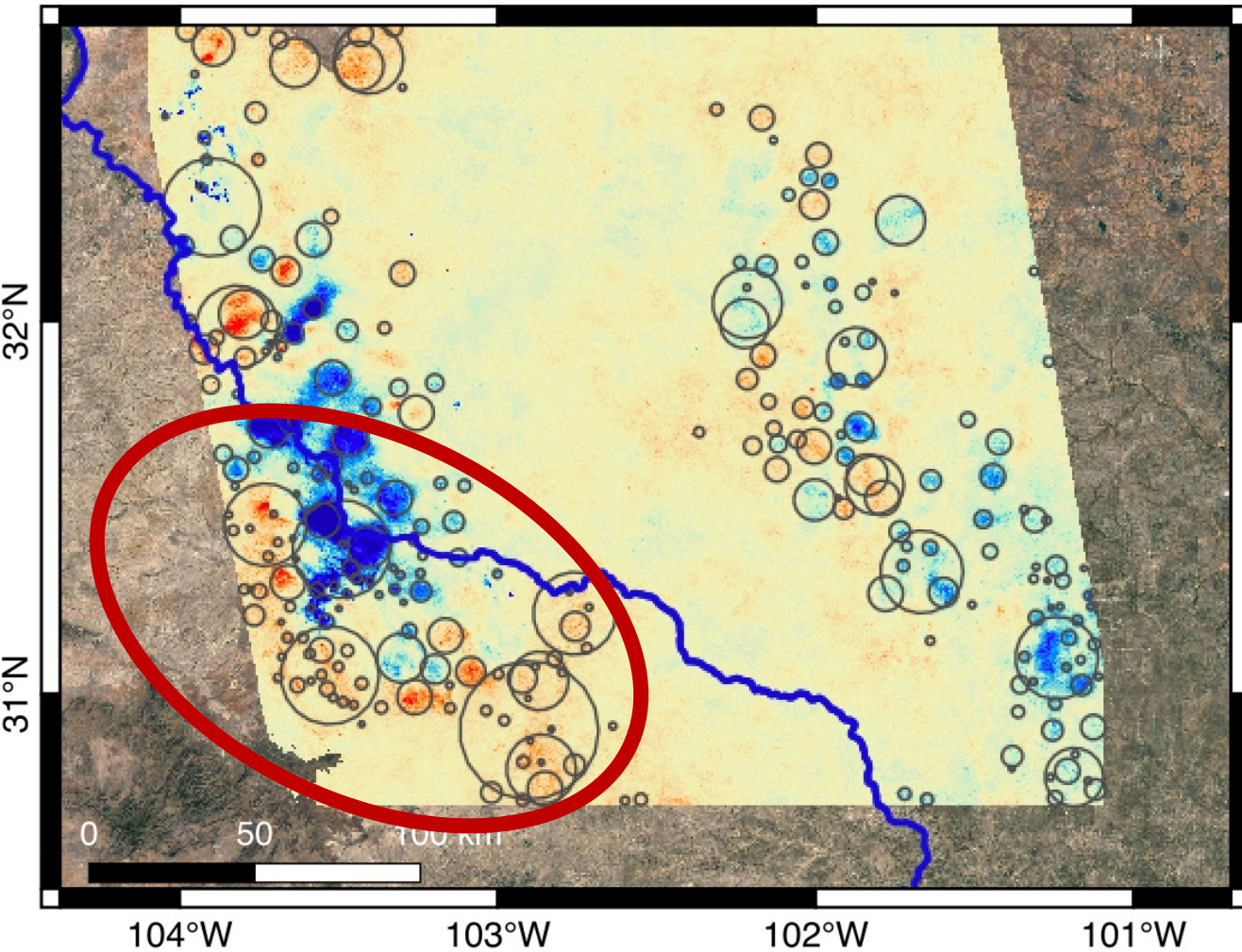# Noise simulations to create PDF of turbulence artifacts

Noise simulated from spectrum

90 instances

...

[cm]

Time series (e.g. SBAS, stacking) for "noise only" deformation map

Blob detection on "noise only" deformation map

Noise simulations to create PDF of turbulence artifacts
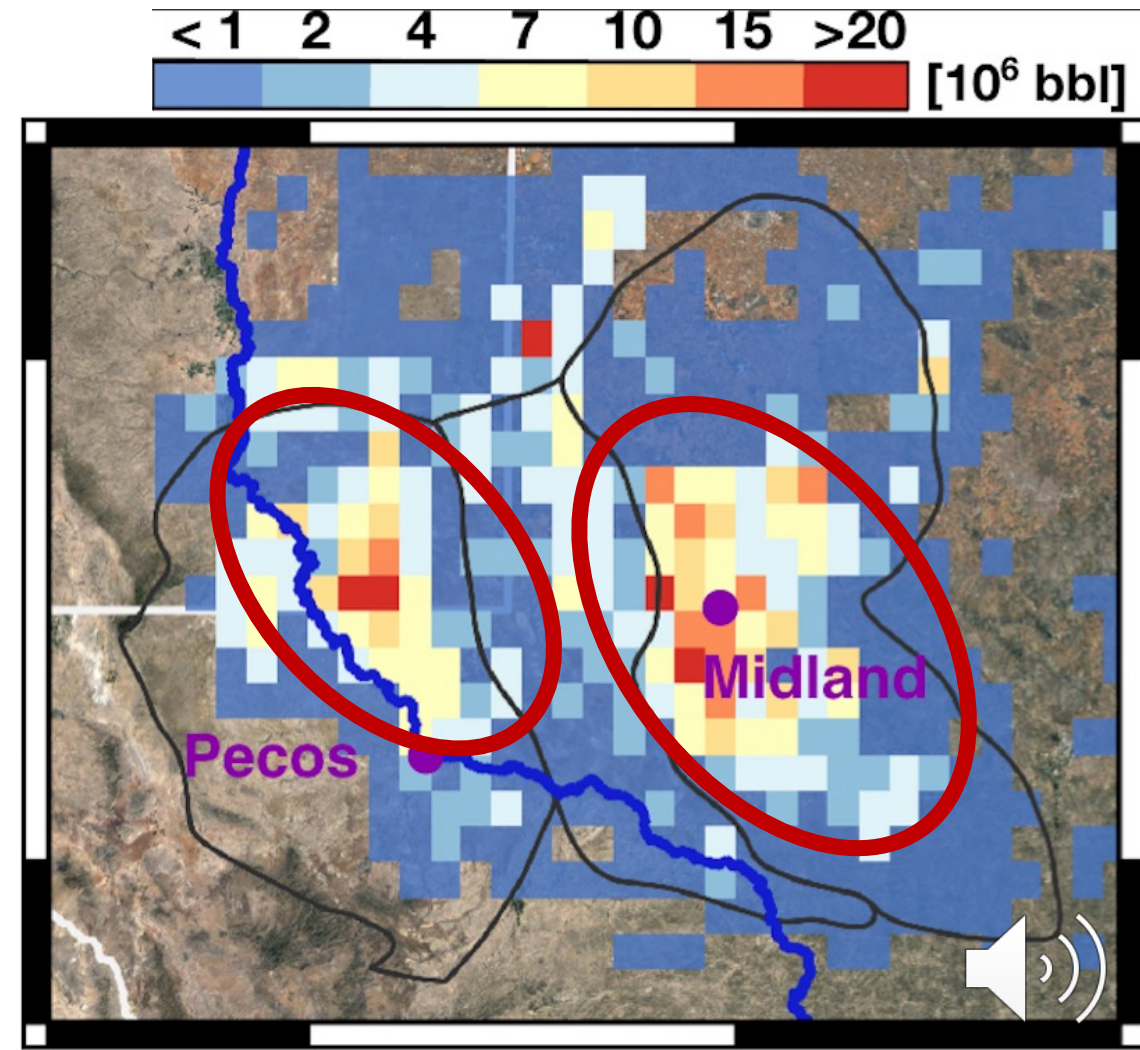
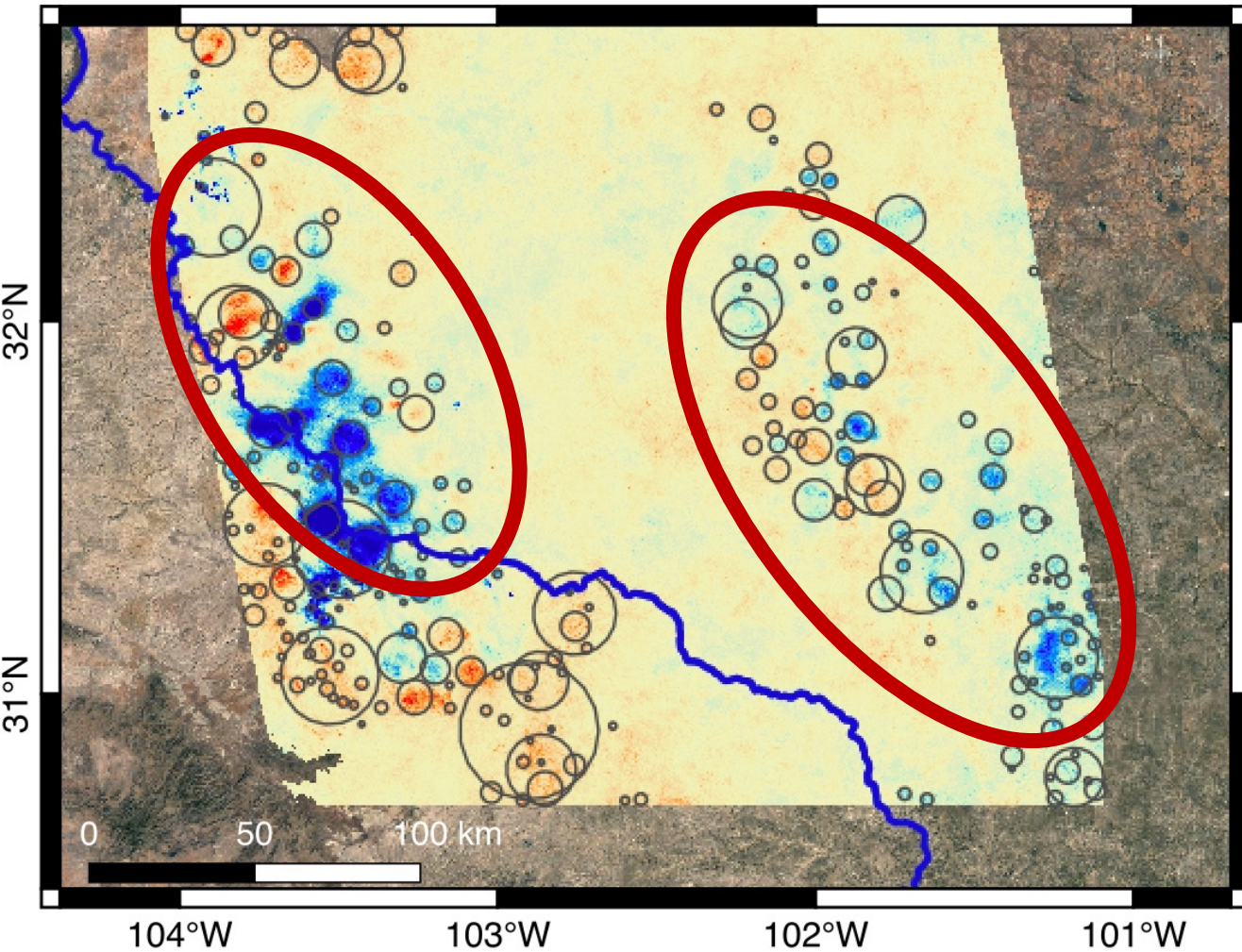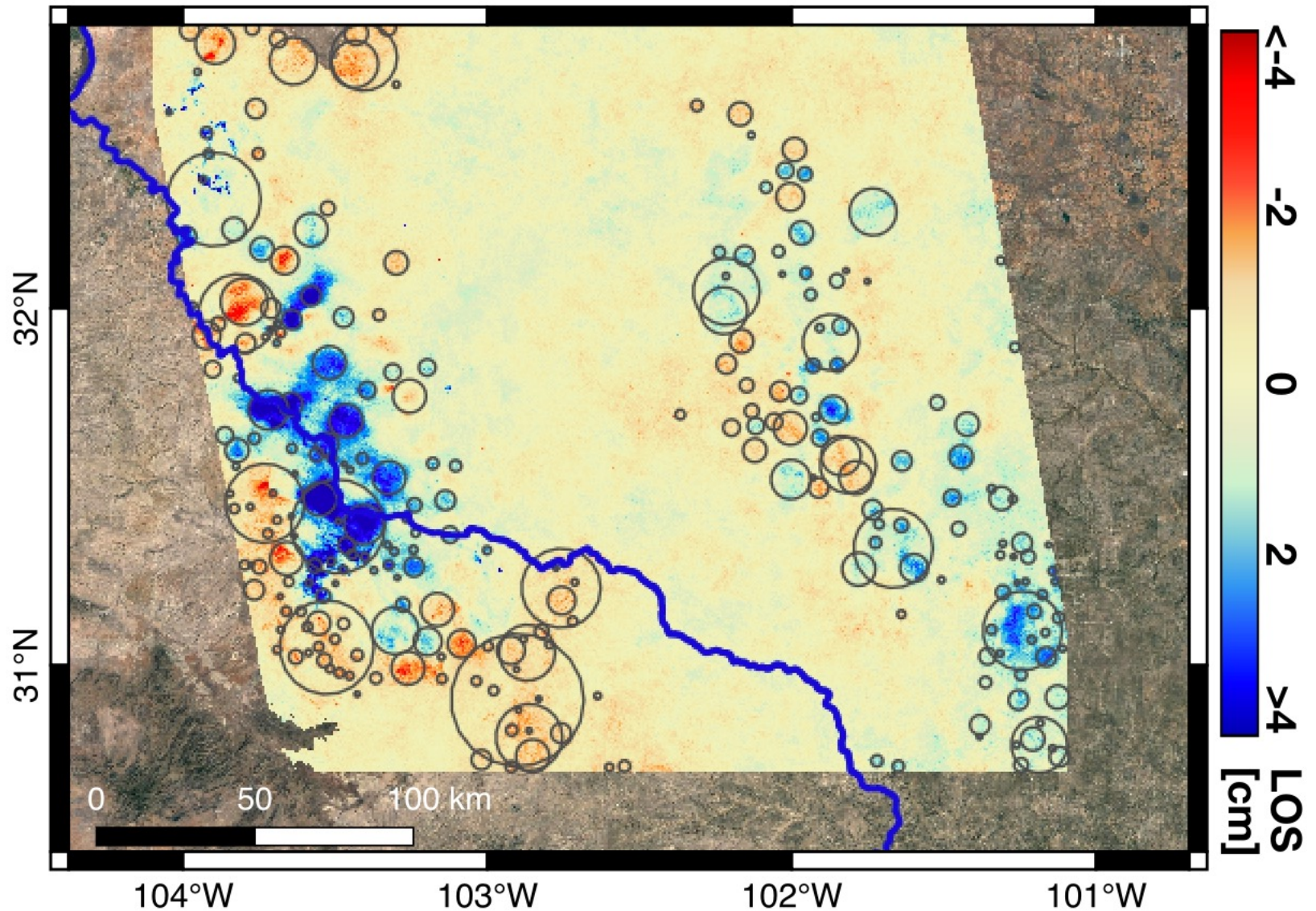PDF of noise artifacts in deformation maps

Low p-value detections: p < 0.01

Low p-value detections: p < 0.01

Low p-value detections: p < 0.01

Low p-value detections: p < 0.01

Low p-value detections: **p < 0.05**