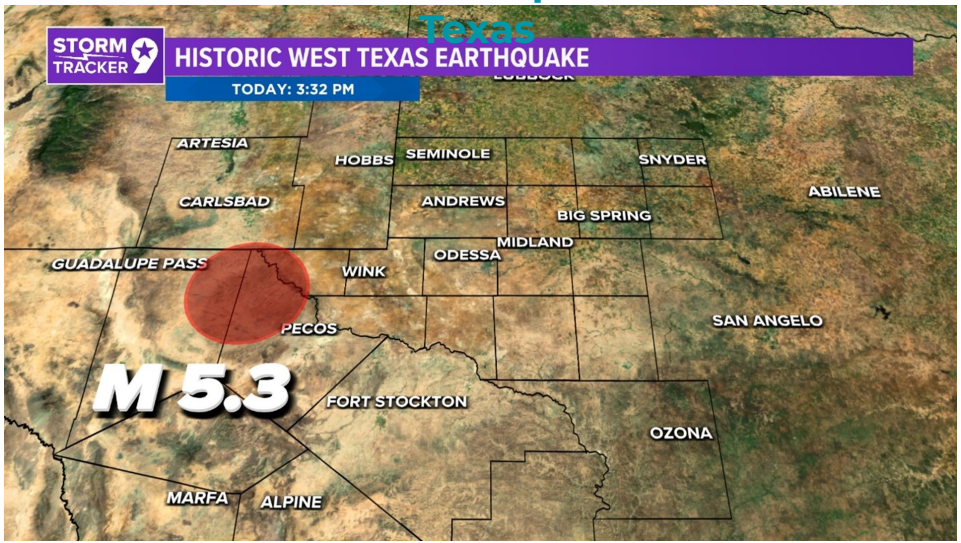
TENSORA

The next generation in geophysics

Leaks and seismicity are leading to **downtime, loss of revenue and liability**

Powerful M5.3 Earthquake Hits West



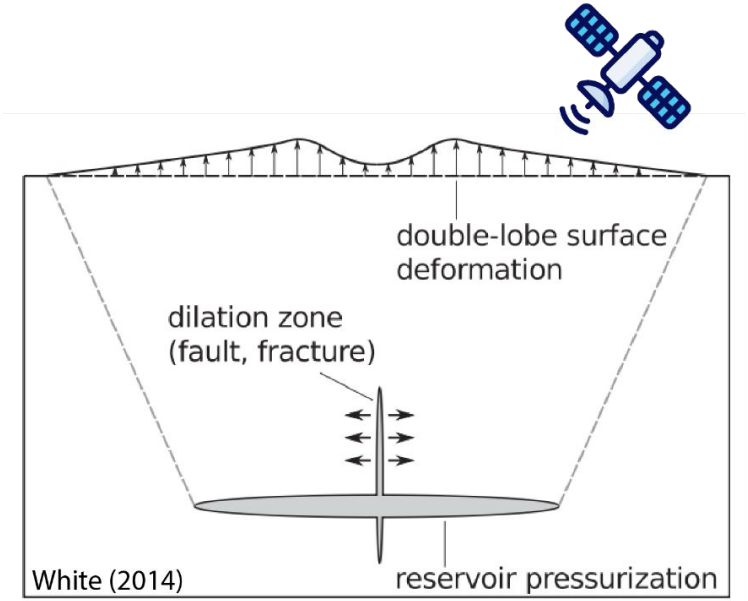
NBCDFW (2022)

A forgotten oil wells births 100ft Geyser

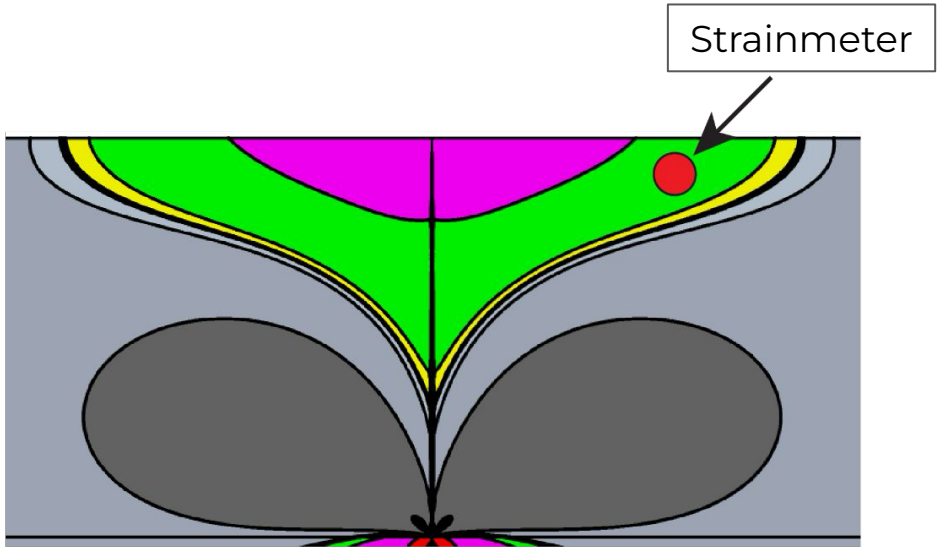
Texas Monthly (2022)

Feasibility of Deformation Monitoring

Deformation monitoring has been used to detect a leak.

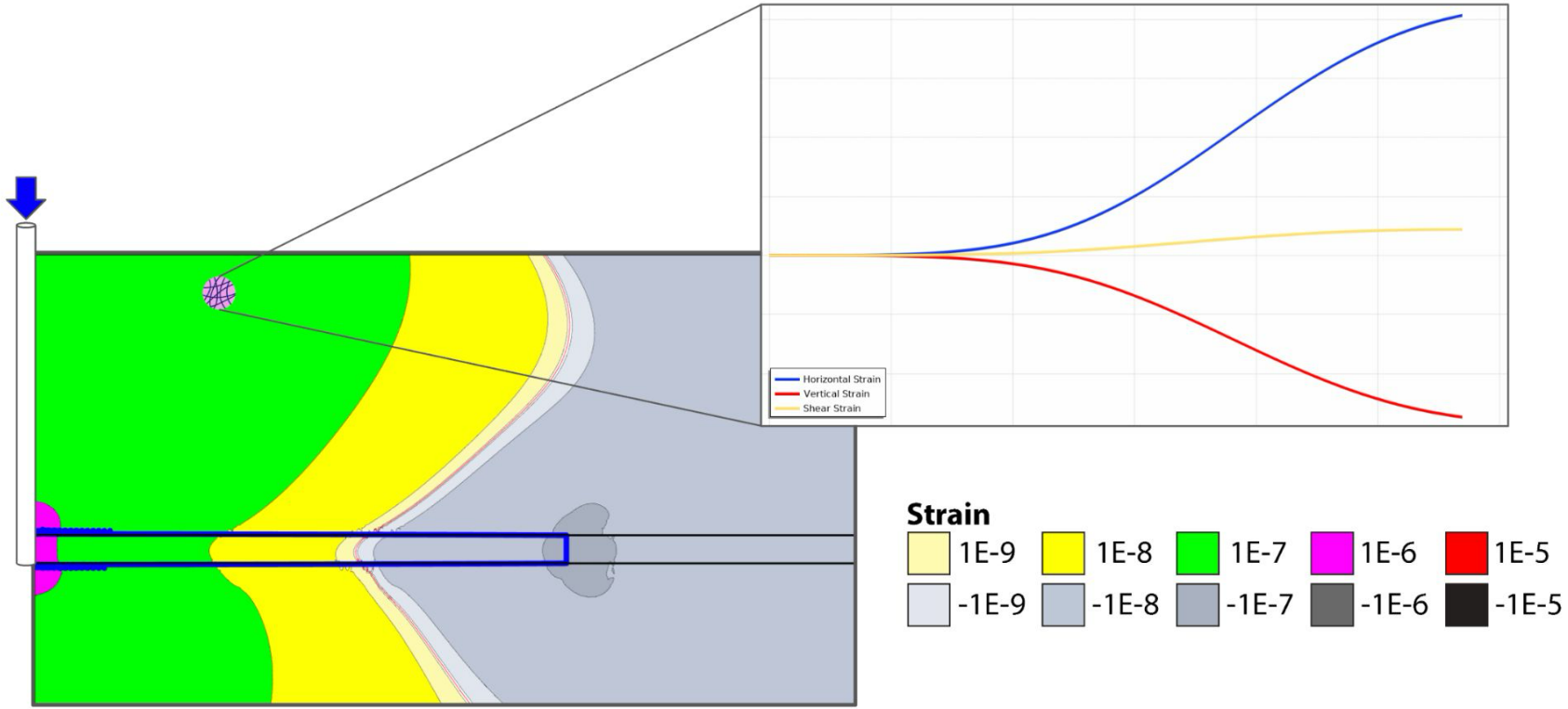


Uplift from Leak



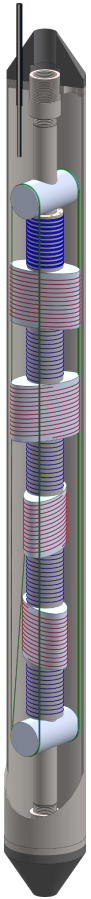
***Deformation* from Leak**

Approach | Above Zone Deformation Monitoring

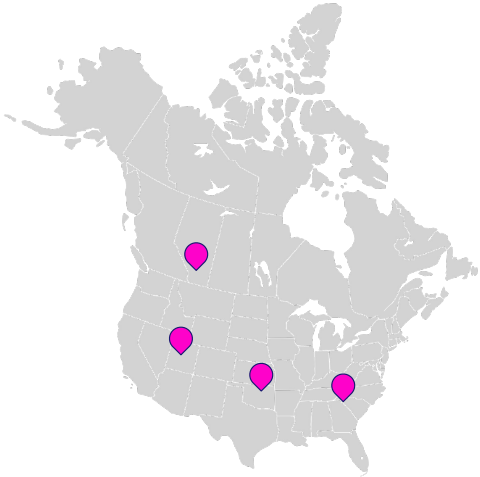


The Tensor Sensor

Near real-time deformation monitoring

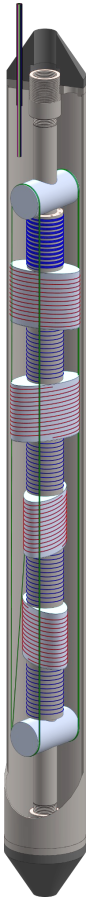


- **3D Strain + Temperature**
- **Ultra-high Resolution (part-per-*trillion*)**
- **Ultra-Broadband (DC to 1 kHz)**
- **Low Power (Battery operated)**
- **Real-time Data Streaming**
- **Field Proven at TRL-7**

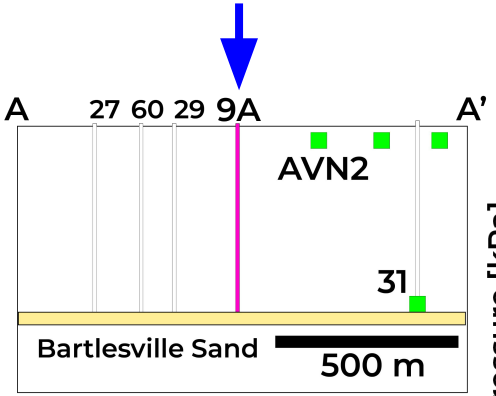


Field Demonstration

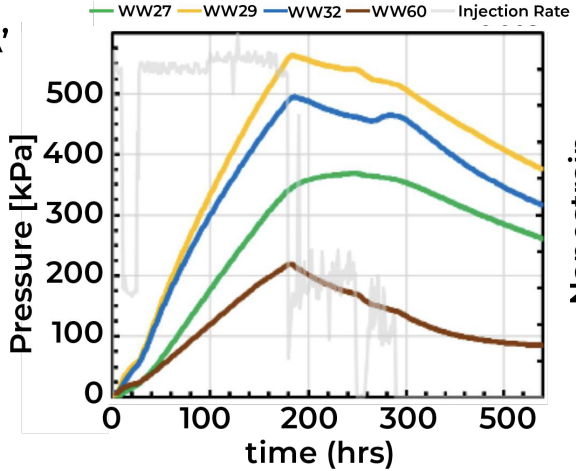
Injection Test (Avant, OK)



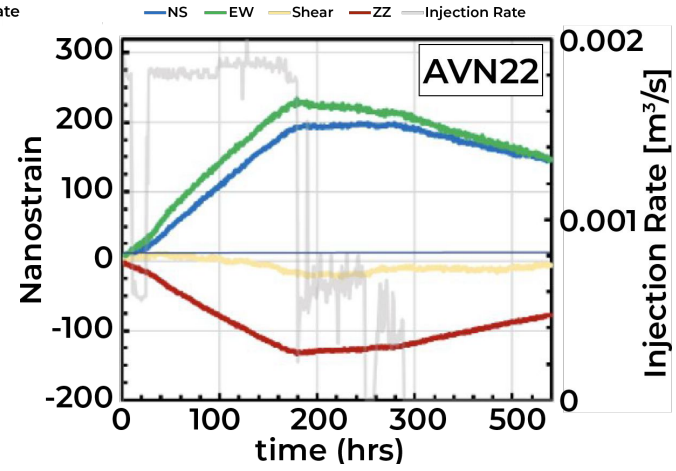
Injection Rate:
30 GPM



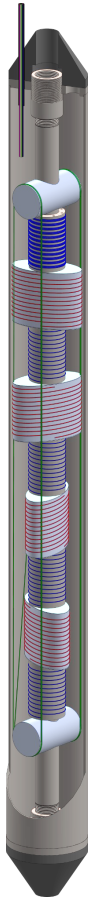
Deep
Pressure

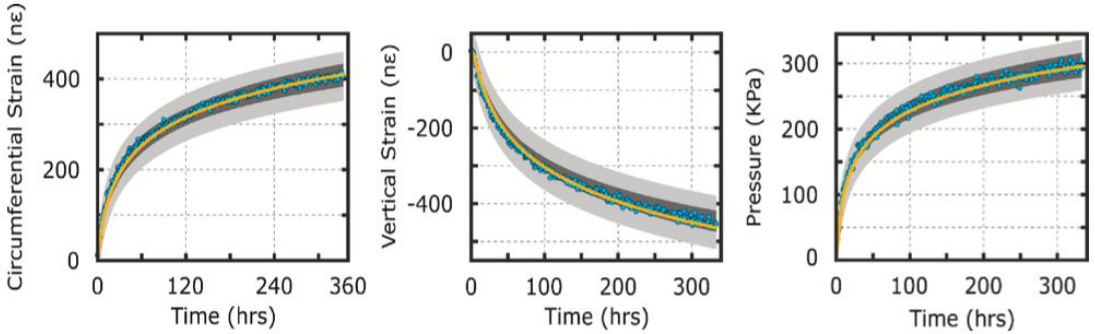


Shallow
Strain

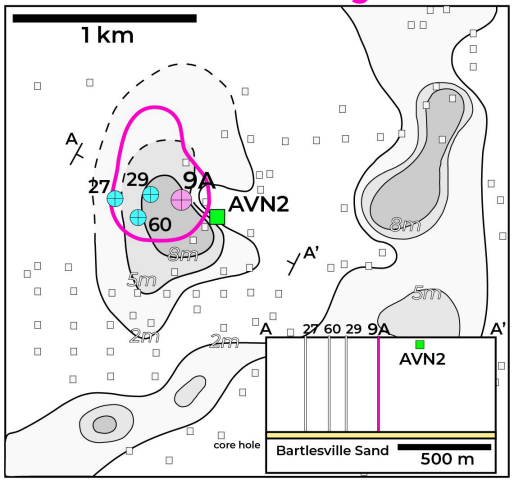


Interpretation | Bayesian Inversion for Characterization

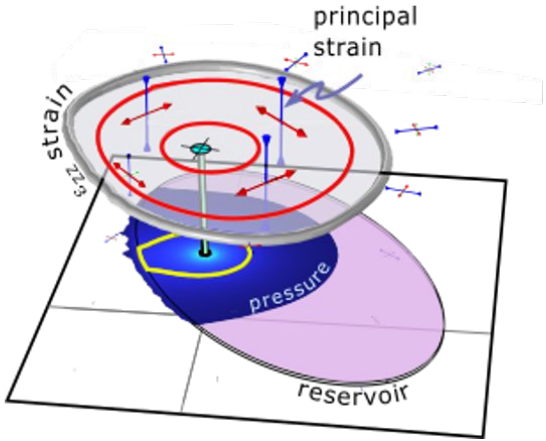




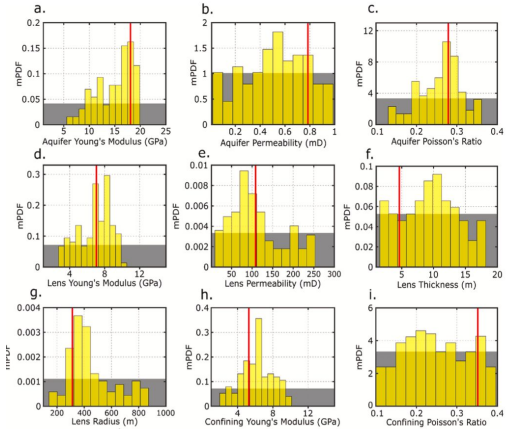
Geometry



Pressure



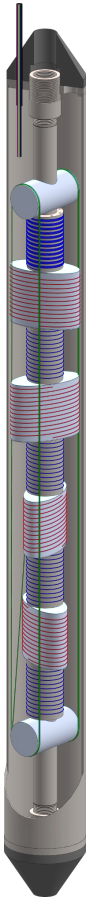
Properties

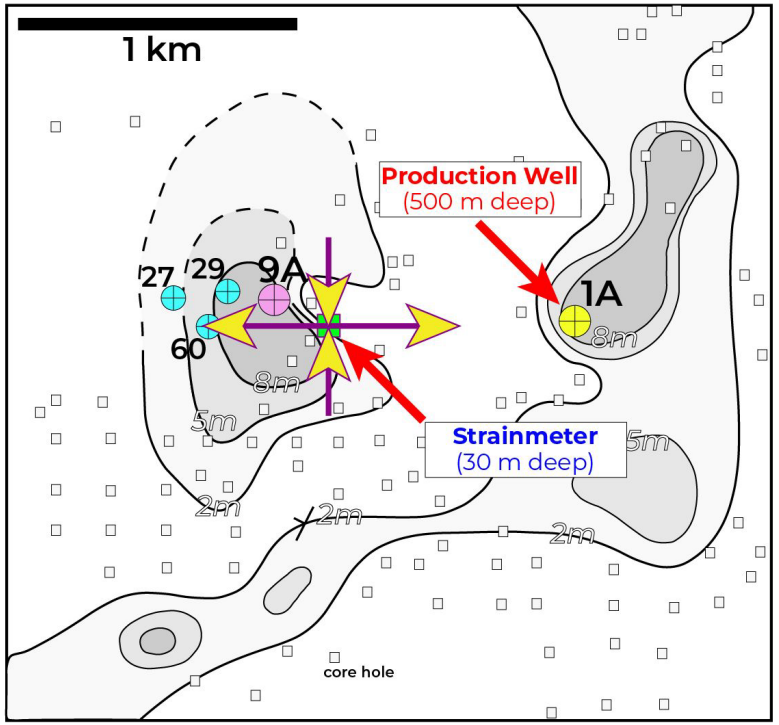


Roudini (2023)

Field Demonstration

Using the strain tensor to locate pressure anomalies





A Blind Test: *Detecting & Locating an Operating Well*

Ambient strain data ***detected*** a pressure anomaly

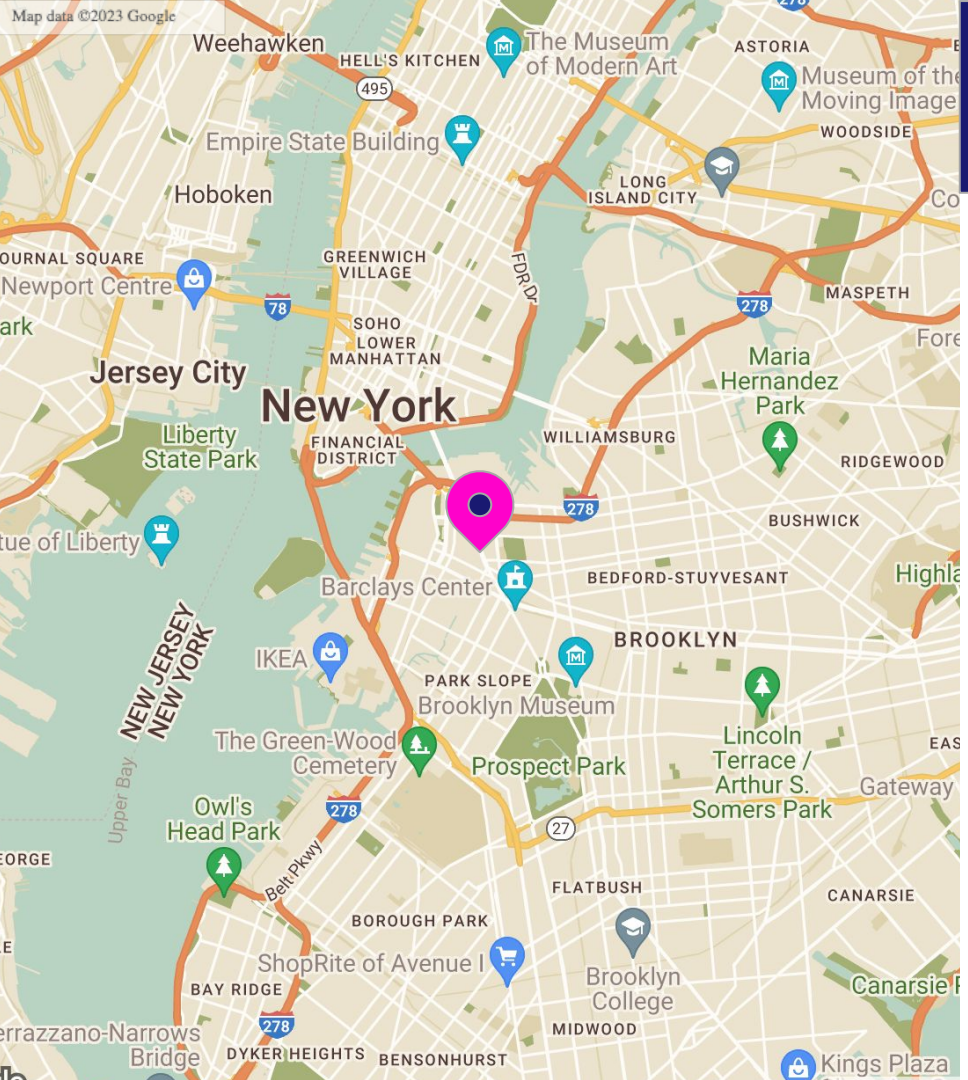
The strain tensor ***located*** production well 1A

Similar signal from ***leak***?

Takeaways

Above-zone deformation monitoring may be used to:

- Characterize reservoir properties,
- Identify reservoir boundaries and sealing faults,
- Monitor subsurface pressures and identify anomalies, and
- Reduce the penetrations through the caprock seal.



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