



Building for the Future

WHERE SCIENCE IS NOT SETTLED:

INNOVATION FUELS TEXAS OIL AND GAS

CAL COOPER

TIPRO SUMMER CONFERENCE 2019





Improving with Technology



HOW TO OPTIMIZE DENSE PADS?

From URTeC: 884 (2019) E. Dontsov, Von Gonten Labs, LLC

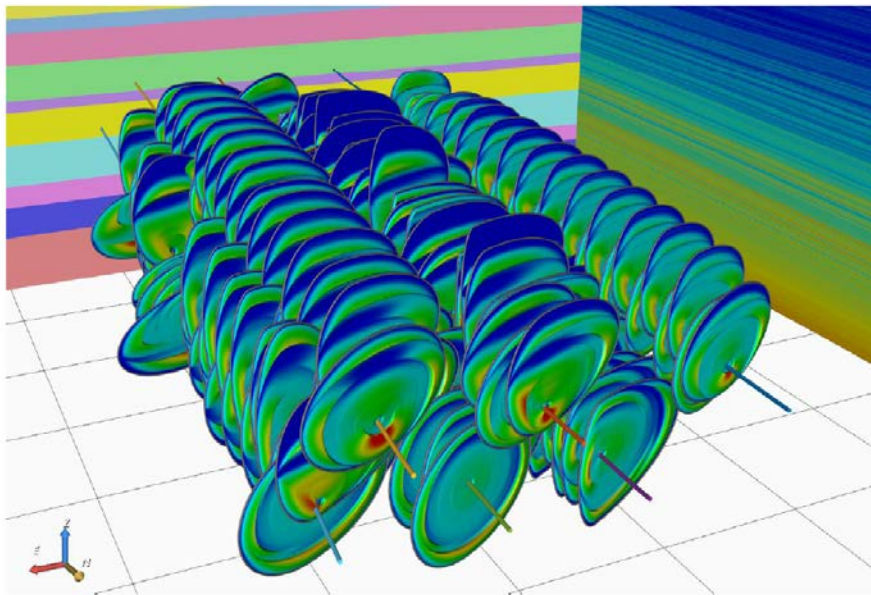
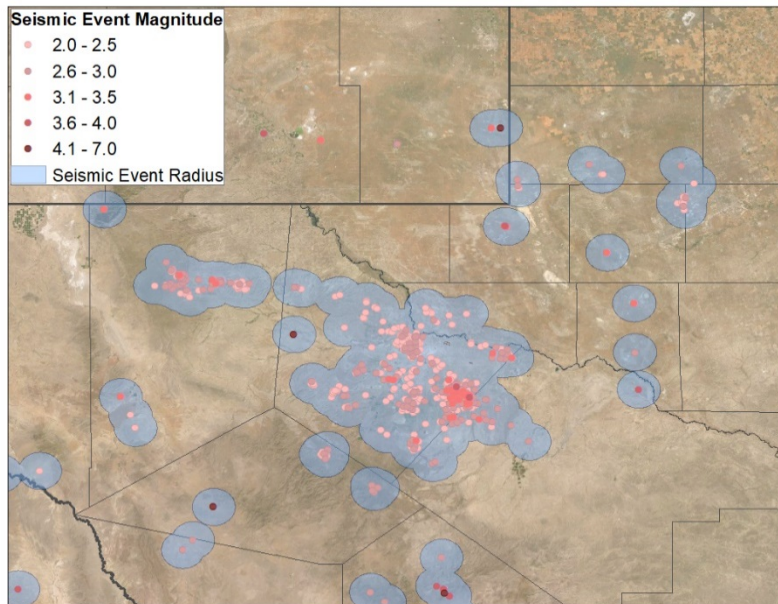


Figure 20. Example multiwell simulation in a cube with heterogeneous properties varying horizontally at 500 ft resolution.

- ▶ Better monitoring
- ▶ Geophysical and Simulation techniques
- ▶ Potential fields
- ▶ Curious minds, testing
- ▶ Compelling innovation

INDUCED SEISMICITY

TexNet, UT-BEG CISR, & RRC



North Texas quakes

Scientists studying North Texas earthquakes found new fault lines and a strong correlation between gas drilling wastewater injection and seismic activity.

- Earthquakes
- Faults
- Populated areas

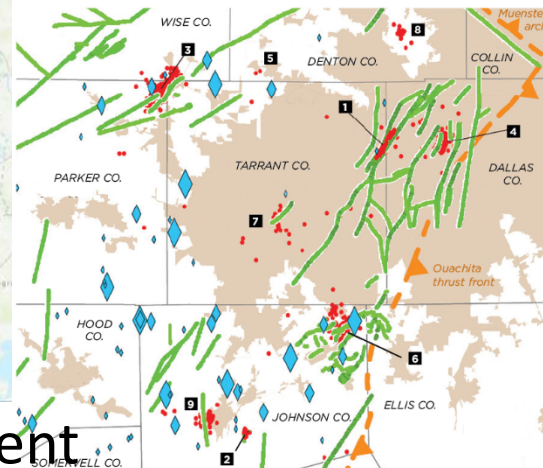
Saltwater disposal wells

Cumulative injection 2000-17

- < 25 million barrels
- > 50 million barrels

Earthquake sequences studied (and initial year of activity)

- | | |
|------------------------|--------------------------|
| 1 DFW airport (2008) | 6 Venus (2015) |
| 2 Cleburne (2009) | 7 Fort Worth (2017) |
| 3 Azle-Reno (2013) | 8 Lake Lewisville (2017) |
| 4 Irving-Dallas (2015) | 9 West Cleburne (2018) |
| 5 Haslet (2015) | |



SOURCES: Bulletin of the Seismological Society of America: "Injection-Induced Seismicity and Fault-Slip Potential in the Fort Worth Basin, Texas" by Peter H. Hennings, Jens Erik Lund Snee, Johnathon L. Omsund, Heather R. DeShon, Robin Dornseise, Elizabeth Horne, Casey Lemons and Mark D. Zoback; "Tracking Induced Seismicity in the Fort Worth Basin: A Summary of the 2008-2018 North Texas Earthquake Study Catalog" by Louis Guirones, Heather R. DeShon, Seongju Jeong, Paul Ogwari, Omar Suli, Monique M. Holt and Kevin B. Kowog; Dallas Morning News research Staff Graphic

- M 2.0 Event
- Depth ?



Guidelines for Permitting Salt Water Disposal Wells in the Permian Basin



THANK YOU
