# Seismic Inversion Technique to Provide High-Resolution $CO_2$ Monitoring

## Scientific Achievement

**A powerful new "seismic inversion" technique uses time-lapse seismic data to make high resolution images useful for evaluating subsurface migration of $CO_2$ following geologic sequestration. The technique images the thin layers of rock that may influence the migration of the $CO_2$ plume. The effectiveness of the technique was validated with the time-lapse surface seismic surveys at the Cranfield Mississippi field $CO_2$ sequestration demonstration.**

## Significance and Impact

**The high-resolution imaging capability will offer more effective monitoring of $CO_2$ plume migration during geologic sequestration.**

## Publications


Zhang, R., R. Ghosh, M. K. Sen, and S. Srinivasan (2013), Time-lapse surface seismic inversion with thin bed resolution for monitoring $CO_2$ sequestration: A case study from Cranfield, Mississippi, *International Journal of Greenhouse Gas Control*, *18*, 430-438.

Zhang, R., M. K. Sen, S. Phan, and S. Srinivasan (2012), Stochastic and deterministic seismic inversion methods for thin-bed resolution, *Journal of Geophysics and Engineering*, *6*(5), 611-618.

Zhang, R., M. K. Sen, and S. Srinivasan (2013), A pre-stack basis pursuit seismic inversion, *Geophysics*, *78*(1), R1–R11.


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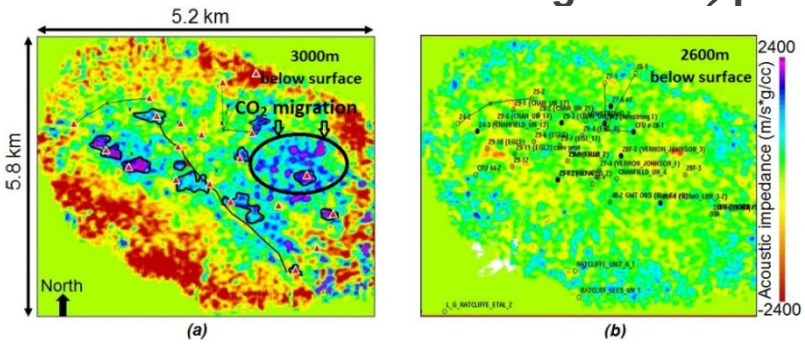


High resolution inverted seismic images of $CO_2$ migration at the Cranfield, Mississippi field injection site: a) Areal view of the reservoir after injection at a depth of 3000 m below the surface showing $CO_2$ migration (indicated by purple shaded areas within and outside the circled region) near the injection wells. (b) Areal view of the rock layer above the injected zone, at a depth of 2600 m below the surface, showing no evidence for leakage of $CO_2$ through the reservoir seal..


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