# High Resolution Imaging of $CO_2$ Plume in the Subsurface

## Scientific Achievement

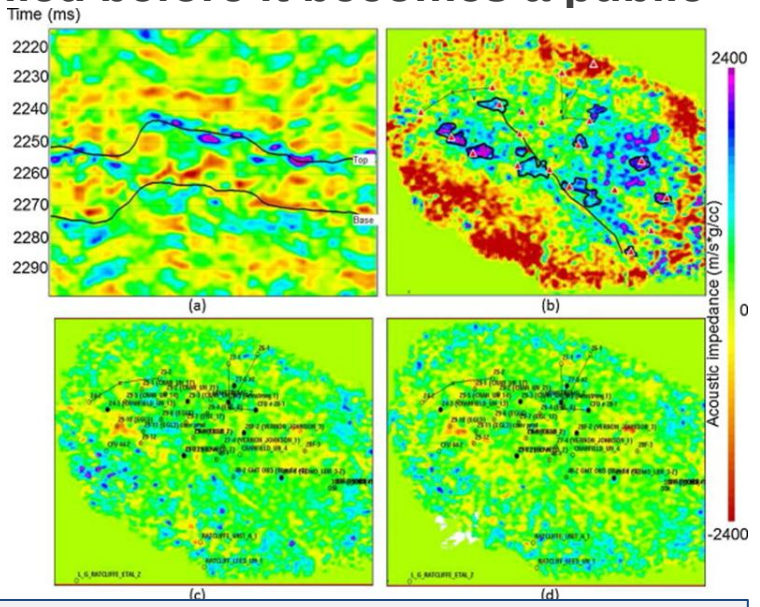
**Developed technique to image permeable pathways in the subsurface along which carbon dioxide migrates using time-lapse seismic data.**

## Significance and Impact

**Monitoring migration of carbon dioxide in the subsurface is important because unanticipated plume migration has to be controlled before it becomes a public hazard.**

## Research Details

- The unique seismic inversion technique images thin layers of rock that can influence migration of $CO_2$ plume thus providing high-resolution monitoring capability.
- Inversion uses a dictionary of seismic wavelets and an optimization algorithm to identify dictionary elements that best fit seismic data.
- Technique applied to time-lapse data to identify $CO_2$ migration path ways.




a) Cross section showing $CO_2$ migration to the top of the layer; (b) Area view showing CO2 migration. (c) and (d) Area view of the overburden showing no leakage of CO2 through the reservoir seal.

Zhang, R., Ghosh, R., Sen, M.K. and Srinivasan, S: International Journal of Greenhouse Gas Control, http://dx.doi.org/10.1016/j.ijggc.2012.08.015, September 2012.