Seismic monitoring of CO2 geosequestration: CO2CRC Otway project case study

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The CO2CRC Otway Project is Australia's first demonstration of the deep geological storage of carbon dioxide. Its test site is located in Victoria, onshore. Within the bound of the first phase of the Otway project ~61000 tonnes of CO_2/CH_4 mixture were injected into depleted gas reservoir located at a depth of 2 km. Second phase of the project is dedicated to injection of small amount (up to 10 000 tonnes) of CO_2-rich gas to saline aquifer at depth of ~1.3 km. Time-lapse seismic is a powerful tool for imaging of changes in the subsurface such as migration of CO_2 within reservoir and assurance monitoring of possible leakage to other formations. However imaging of gas-into-gas injection (phase I) or injection of very small amounts (phase II) using land seismic are complicated problems. To meet these challenges a comprehensive seismic program is developed and being implemented. It includes surface and borehole time-lapse seismic surveys. First 3D survey was acquired in year 2000 to find gas fields in the area, two more surveys were shot in 2008 (pre-injection baseline) and 2009 (first monitor, ~31 000 tonnes of gas were injected to the date of survey), next survey is scheduled at January, 2010. A number or repeated 2D surveys were acquired over last several years to optimize 3D seismic acquisition technique and investigate repeatability of land seismic data.

In this presentation we discuss problems and preliminary results of time lapse seismic monitoring of CO2 sequestration in Otway.