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Microseismic monitoring at the commercial-scale CO_2 geological storage site, Cranfield, U.S. (Part 2)

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Microseismic events induced by CO_2 geological storage have been discussed. These induced events are assumed to be unfelt with negative magnitudes by concerning case studies at the CO_2 injection sites around the world. For ensuring the safety and obtaining public acceptance, microseismic monitoring is necessary for operating CCS project, especially for countries with high seismicity such as Japan.

RITE performs a long-term microseismic monitoring at the commercial-scale CO_2 injection site in the U.S. to evaluate the relation between CO_2 injection and microseismicities collaborating with Lawrence Berkeley National laboratory (LBNL) and Bureau of Economic Geology, University of Texas at Austin (BEG). Obtained knowledge will be utilized to develop microseismic monitoring system for the planning CCS pilot project held in Japan.

Microseismic monitoring is conducted at the Cranfield oilfield, Mississippi. This site is the CO_2-EOR field, a million tons of CO_2 is injected into the Cretaceous sandstone reservoir at the depth of 3,100m every year. A total of 4 million tons of CO_2 have been injected since 2007. RITE composed a microseismic monitoring array at the site deploying 6-3component of seismometers at the depth of 100m in a 3km radius. Monitoring started on December 15th 2011. For the initial data for a month, no microseismic events induced by CO_2 injection have identified [Takagishi et al, (2012, JpGU)].

In this presentation, we will show preliminary results by analyzing the microseismic data recorded for more than a year. We confirmed that monitoring system was working normally, but no CO_2 injection induced microseismic events have been detected for now. The recorded data were classified into background noise, artificial noise, lighting strikes, and teleseismic natural earthquake events. The results were concordant with those obtained by visual judgments. We will also discuss the event detection ability (Magnitudes and Epicentral distances) for the monitoring system at the site using the recorded teleseismic natural earthquake events.

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Keywords: CO_2 geological storage, microseismic monitoring