

Induced Earthquakes Before and After Cessation of Longterm Injections in Rongchang Gas Field, Sichuan, China

*Zhiwei Wang¹, Xinglin Lei², Jinrong Su³, Shengli Ma¹, Yusuke Mukuhira⁴

1. Institute of Geology, China Earthquake Administration, 2. Geological Survey of Japan, AIST, 3. Earthquake Monitoring Centre, Sichuan Earthquake Administration, 4. Institute of Fluid Science, Tohoku University

For more than three decades, the depleted Rongchang gas reservoir in China's Sichuan Basin was used for the disposal of unwanted water, which resulted in induced earthquakes, with magnitudes as high as 5.2. After all wells were closed, the frequency of seismic activity was observed to decay following a modified Omori law, and since April 2015, seismic activity again began to increase, and a M4.9 earthquake occurred on 27 December. The results of an Epidemic Type Aftershock Sequence (ETAS) model analysis show that forced seismicity accounted for more than 70% of the total events. For most Magnitude greater than 3.5 earthquakes, including two Magnitude greater than 4 events, the estimated overpressure was lower than the maximum injection pressure. These results, coupled with the fact that postinjection seismic activity has similar characteristics to seismicity during injection, indicate that the injected overpressure fluid was still the driving factor for postinjection seismic activity.

Keywords: Longterm Injection Induced Earthquakes, Postinjection Seismic Activity, Overpressure Fluid

