

عنوان مقاله:

MONITORING OF INDUCED SEISMICITY IN NORTHEAST BRITISH COLUMBIA, CANADA

محل انتشار:

هشتمین کنفرانس بین المللی زلزله شناسی و مهندسی زلزله (سال: 1398)

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خلاصه مقاله:

During the past decade, fluid injection for the purpose of hydraulic fracturing (HF) and wastewater disposal (WWD) have caused a sharp increase in seismicity rate in the central and eastern United States and Western Canada. Although most of the wells drilled for HF and WWD do not cause felt earthquakes, shallow depth of these events and proximity to populated areas and infrastructure raises significant concern regarding the seismic hazard from larger induced events and motivates close monitoring of oil and gas activities. The BC Seismic Research Consortium (BCSRC) was established in 2012 with collaboration among Geoscience BC, BC Oil and Gas Commission, Natural Resources Canada, and Canadian Association of Petroleum Producers. The aim of BCSRC is to monitor oil and gas activities in the northeast British Columbia (NE BC) and the seismicity associated with HF and WWD operations. Here, I present an overview of the major works performed by BCSRC in filling the knowledge gaps regarding induced seismicity processes in NE BC. Before 2012, the Canadian National Seismic Network operated only two seismograph stations in NE BC (Figure 1). The large magnitude of completeness (~ 3 ; Babaie Mahani et al., 2016) of this network lacked the sufficient precision to monitor small induced earthquakes in this area. Since then, several stations have been installed in NE BC, which significantly improved event detectability of the regional seismic network. Currently, the regional seismograph network in NE BC includes 18 stations from which data is available for public access via IRIS. Moreover, through collaborations with universities and industry, data from other stations in the region are used for more accurate event detections and research purposes. Enhancement of the regional network in NE BC and the surrounding areas such as western Alberta have decreased the magnitude of completeness by 1-2 order of magnitudes. An important aspect of the monitoring project is answering the knowledge gaps regarding induced seismicity processes in NE BC with the aim of reducing the potential seismic hazard from these earthquakes. Using a comprehensive earthquake catalogue compiled by Visser et al. (2017), Kao et al. (2018) analyzed the tectonic strain rate in western Canada and its relation with induced seismicity. They found that, in areas with moderate tectonic strain, injection may temporarily increase the local seismic hazard, but over an extended period, widespread injection-induced earthquakes may deplete the available tectonic moment, reducing regional seismic hazard. Although there ... have

کلمات کلیدی:

Induced Seismicity, Ground motion, Hydraulic fracturing, Montney formation, Western Canada sedimentary basin

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