

Earth Sciences

Colloquium Series



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Identification and Characterization of Fluid Disposal Induced Seismicity in Alberta, Canada

This presentation examines the identification and characterization of fluid disposal–induced seismicity in Alberta using recent provincial case studies. Induced seismicity in Alberta has evolved from being dominated by hydraulic fracturing to increasingly involving wastewater disposal, which has produced the largest induced earthquakes recorded in the province and presents distinct challenges for identification, mitigation, and regulation. Using an evidence-based framework, including the questionnaire of Foulger et al. (2023), we demonstrate that disposal-induced seismicity must be assessed through the integration of spatiotemporal plausibility, earthquake depth, geological context, and operational history, rather than correlation alone. Case studies from Central Musreau Lake, Gold Creek, Kakwa, and the Peace River region illustrate delayed triggering, cumulative pressure effects, and basement-rooted fault activation, primarily associated with disposal into the Leduc Formation and locally the Winterburn Group. The Reno cluster highlights how interpretation evolves with improved data: deployment of a dense seismic nodal array significantly improved depth constraints and increased confidence in an induced origin despite weak short-term correlations. These cases informed regulatory evolution under Directive 065, emphasizing hazard-based management, monitoring, mitigation, and coordinated response strategies.

Date: Friday, October 23, 2026

Time: 1:30 pm

Location: BGS 0153

Coffee and Timbits will be served.