

# 6-12 - HIGH-RESOLUTION CHIRP SEISMIC REFLECTION PROFILING OF JACKSON LAKE: GRAND TETON NATIONAL PARK, WYOMING



Thursday, April 1, 2021



5:05 PM - 5:15 PM



FMR, Inc. Room (Online)

## Abstract

This study utilizes a recently acquired, high-resolution CHIRP seismic reflection dataset to analyze the late Pleistocene and Holocene stratigraphy of Jackson Lake (Wyoming). The western shoreline of Jackson Lake is adjacent to the Teton fault, a down-to-the-east normal fault that produces the spectacular high topography of Grand Teton National Park. The Teton fault is considered a major seismic hazard in the U.S. Intermountain West, but the absence of historical slip events limits our understanding of earthquake recurrence in this region, as well as our capacity for hazard planning and mitigation. Here, we use the sedimentary fill of Jackson Lake as a natural seismograph, like peer-reviewed studies of post-glacial lake strata in Alaska, Europe, and South America. As one of the first basin-scale CHIRP surveys of the lake, we developed new bathymetric and basin-fill thickness maps that illustrate the distribution of available accommodation, sedimentary depocenters, and sublacustrine geomorphology. Major potential seismic units were mapped by identifying unconformities and correlative conformities, and facies within the units were used to interpret depositional processes. Evidence of potential earthquake activity, for example mass transport complexes, was mapped based on acoustic facies characteristics and placed within the relative chronology of the seismic stratigraphic framework established by this study. A short sediment core, dated with  $^{210}\text{Pb}$ ,  $^{137}\text{Cs}$ , and  $^{14}\text{C}$ , serves as sedimentary ground truth for the shallowest seismic reflectors and provides initial insights into deepwater sedimentation rates. This research will help guide future long coring in this basin, which will be needed to establish the chronology of all interpreted late Quaternary earthquake-related deposits.

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