Universität
Münster

Allgemeines Physikalisches Kolloquium

Donnerstag, 06.11.25 – 16 Uhr c.t.

IG1 – HS 2 | Wilhelm-Klemm-Str. 10

Kolloquiums-Kaffee ab 16 Uhr vor dem Hörsaal

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Capturing mega-tsunamis with seismology

Climate change is increasingly predisposing polar and alpine regions to catastrophic landslides. In September 2023, we detected the onset of an unprecedented 9-day, global 10.88-millihertz (92-second) monochromatic very-long-period (VLP) seismic signal originating from East Greenland. This signal began with a glacial-thinning–induced rock-ice avalanche of 25×10^6 m^3 plunging into Dickson Fjord, triggering a 200-meter-high tsunami. Simulations show that the tsunami evolved into a 7-meter-high, long-duration seiche oscillating at 11.45 mHz, whose frequency and amplitude decay closely matched the seismic observations. An oscillating fjord-transverse single force of $\sim 5 \times 10^{11}$ N reproduced both the seismic amplitudes and their radiation pattern, confirming that the seiche directly generated the 9-day-long signal. In August 2025, another landslide, this time in Alaska's Tracy Arm fjord, produced a 481-metre high mega-tsunami, preceded by days of accelerating micro-seismicity. The failure generated globally observed long-period seismic waves equivalent to a magnitude-5.4 earthquake, followed by ~66-second monochromatic signals lasting over 36 hours.

These events demonstrate how climate-driven glacier retreat can trigger cascading hazards — linking slope failure, fjord seiches, and globally detectable seismic waves — and highlight the growing risks posed by landslide-induced tsunamis in increasingly visited fjord environments

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Fachbereich
Physik