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Seismological analysis of the September 16, 2023 Greenland landslide triggering a 50 hours long monochromatic very long-period signal

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On September 16, 2023, a landslide collapsed in the Dickson Fjord, a remote area of East Greenland. The collapse triggered a tsunami that hit Ella Island, which lies to the east of the fjord. The mass movement is identified in high resolution Planet Labs Dove mini-satellite imagery, and the generated seismic signals were recorded at both regional and teleseismic distances. The seismic records reveal a first strong transient signal (0.02-0.06 Hz) around 12:35:00 UTC, which we attribute to the landslide, followed by a long-lasting (~50 hours) monochromatic (~0.01 Hz) signal at teleseismic distances. We perform full waveform inversions using moment tensor and single force models to characterize the source of both signals. At regional distances, the first transient signal is well reproduced by single and double source models and is consistent with the landslide process. The long-lasting oscillation is modeled by a damped dipole oscillator, which is in agreement with the Love and Rayleigh waves radiation patterns observed at different azimuths. Using multiple different data and source models we are able to characterize the complex source process.