

VERY-HIGH-RESOLUTION PSEUDO 3-D SEISMIC VOLUME OF A SUBMARINE MASS MOVEMENT DEPOSITS: AN EXAMPLE FROM THE POINTE-DU-FORT AREA, UPPER SAGUENAY FJORD, CANADA.

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Abstract

In the last few years, 3-D seismic has grown beyond the petroleum geology field in a variety of domains such as environmental and mining geology. However, very-high-resolution 3D seismic volumes have not yet been used extensively in marine geology to reconstitute the evolution in space of a submarine landslide. The Upper Saguenay Fjord region has been recently struck, by various natural disasters including earthquakes, landslides and flash floods. This region represents a unique site to study the internal structure of modern mass wasting deposits. The Pointe-du-Fort mass movement deposits were chosen to adapt and apply 3-D seismic technology utilized in the petroleum industry. Its small size has helped to overcome the scale characterization problems often encountered within the study of larger submarine slides. Some authors have proposed that these deposits represent the spread of a failed mass coming from the south fjord wall triggered by an earthquake. A very-high resolution pseudo 3-D seismic volume was produced to provide a better understanding of the Pointe-du-Fort failed mass. The volume was generated by merging 38 closely spaced 2-D single channel seismic profiles and has permitted to image the internal structure of the mass movement deposits. The seismic data reveal surfaces within the failure lobe that divide it up into smaller units. These observations are consistent with either: a) the stacking of multiple debris flows rather than a single spread event, or b) internal deformation/shear within a failing mass.

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