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The characterization of the Frank Slide deposit

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On the night of the 29th April 1903, approximately 30 millions of cubic meters of limestone slided down the east face of Turtle Mountain (Alberta, Canada). Having killed about 80 people in the village of Frank, the rock avalanche was named after it. The characteristics of this large event are an especially long runout distance of 3 km, a primary fall of 1000 m and an average speed of 30 m/s. The produced deposit has a surface area of 3 km2, its mean thickness is 15 m and it presents an inverse grading with fine grains at its base and boulders at its top.

In this study, based on field work, GIS and statistical analysis, more characteristics of the deposit are examined. An analysis of the block size at the surface of the deposit along three profiles is performed in order to determine the granulometry curve of the blocks. This is completed by a remote sensing analysis. Similarly the morphology and lithology of the deposit is studied. The results show a chaotic morphology, a partially homogenous distribution of the geologic formations and a relation between blocks' diameter and the distance to the scarp. In addition, a distinct element numerical model PFC2D is executed to simulate the transportation of this massive rock avalanche.

This complete analysis provides information about the fragmentation and propagation processes that took place in 1903. Preliminary outcomes show a significant pattern: the lowest in altitude the lithologies are in the cliff, the furthest they have been transported by the slide. Indeed, the Banff Formation which was positioned at the base of the fallen mass, is presently placed in the distal part of the deposit.

The interest of this study is to gather the more details possible on the deposition and transportation in order to understand better the processes that engender the propagation of a large rock avalanche.