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Impact of forest fire on slope dynamics in eastern boreal Canada (Anticosti Island, Québec)

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Forest fire may have major impacts on slope dynamics, especially in rugged relief areas. In 1955, a ˜800 km2 fire devastated mature balsam fir - white spruce forests on Anticosti Island. Burnt areas represent ˜10% of the island total surface area, but ˜90% of the Patate River's catchment. The bedrock is made of sedimentary rocks consisting mainly of Ordovician and Silurian limestone, overlain by Quaternary deposit. Several Patate River's valley slopes, which have already been sensitive in the past, seem to have been further destabilized by the fire. The aim of this study was: 1) to reconstruct past slope movements by analysing vegetation patterns (i.e., distribution of residual vegetation on steep slopes) and using tree-ring techniques to detect pre- and post-fire movements; 2) to identify geomorphological processes responsible for slope dynamics. Seven sites were selected along the valley based on slope characteristics (slope angle, aspect, and morphology) and availability of wood material. Tree damages and responses to erosion and sediment transport (stem tilting, scars, and traumatic resin ducts) were analysed. One of the 7 study sites escaped from the 1955-fire. The trees sampled here had a mean age of ˜78 years and allowed the reconstruction of mass movements over the last century. Pre-fire movements were identified for the following years: 1890, 1922 and 1930. At burnt sites, post fire tree establishment peaked in the 1960s and 1970s. Tree-ring data indicate that slope instability increased after fire and up to present. Years showing simultaneous mass movements at several sites were the following: 1955, 1956, 1969, 1980 and 1996. Meteorological data from Port-Menier and Natashquan weather stations indicate that each of those years, except 1956, showed above-average annual (1969) or summer (1980 and 1996) total precip-

itation (respectively snow and rain). Our study contributes to highlight the role of a severe forest fire on slope instability and dynamics.