Forecasting method of ice blocks fall by logistic model and melting degree-days calculation: a case study in northern Gaspésie, Québec, Canada.

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Ice blocks fall is a serious natural hazard that frequently happens in mountainous cold region. The ice blocks result from the melting and collapse of rockwall icings (ice walls or frozen waterfalls). Environment Canada weather data were analysed for 440 cases of ice blocks fall events reported in northern Gaspésie by the "Ministère des Transports du Québec" (M.T.Q.). The analysis shows that the ice blocks fall are mainly controlled by an increase of the air temperature above 0oC. The melting degree-days (DDmelt) can be used to follow the temperature variations and the heat transfer into the ice bodies. Furthermore, large daily temperature changes, especially drastic drops of temperatures and freeze-thaw cycles, can induce enough mechanical stress to favour the opening of cracks and possibly cause the collapse of unstable ice structures such as freestanding ice formations. By following the evolution of the DDmelt and the best logistic model, it is possible to forecast the collapse of some of the most problematic rockwall icings and target the most hazardous periods along the northern Gaspésie roads.