



Climate change effects on landslides in southern B.C.

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Two mechanisms that contribute to the temporal occurrence of landslides in coastal British Columbia are antecedent rainfall and short-term intense rainfall. These two quantities can be extracted from the precipitation regimes simulated by climate models. This makes such models an attractive tool for use in the investigation of the effect of global warming on landslide frequencies.

In order to provide some measure of the reliability of models used to address the landslide question, the present-day simulation of the antecedent precipitation and short-term rainfall using the daily data from the Canadian Centre for Climate Modelling and Analysis model (CGCM) is compared to observations along the south coast of British Columbia. This evaluation showed that the model was reasonably successful in simulating statistics of the antecedent rainfall but was less successful in simulating the short-term rainfall.

The monthly mean precipitation data from an ensemble of 19 of the world's global climate models were available to study potential changes in landslide frequencies with global warming. Most of the models were used to produce simulations with three scenarios with different levels of prescribed greenhouse gas concentrations during the twenty-first century. The changes in the antecedent precipitation were computed from the resulting monthly and seasonal means. In order to deal with models' suspected difficulties in simulating the short-term precipitation and lack of daily data, a statistical procedure was used to relate the short-term precipitation to the monthly means. The qualitative model results agree reasonably well, and when averaged over all models and the three scenarios, the change in the antecedent precipitation is predicted to be about 10% and the change in the short-term precipitation about 6%. Because the antecedent precipitation and the short-term precipitation contribute to the occurrence of landslides, the results of this study support the prediction of increased landslide frequency along the British Columbia south coast during the twenty-first century.