

**TESTING THE CROCUS SNOWPACK MODEL IN A HIGH-LATITUDE
MARITIME SNOW CLIMATE, AND IMPLICATIONS FOR
HYDROLOGIC AND AVALANCHE FORECASTING**

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ABSTRACT

The city of Juneau is located in southeastern Alaska has a high level of urban avalanche danger, with several large slide paths located above residential areas. In addition, the nearby Eaglecrest ski area has high in-we and out-of-bounds avalanche danger, which is mitigated by a rigorous control program. We are currently collecting a suite of meteorological and snowpack data from a remote automated weather station located in the ski area at 670 m.a.s.l. Parameters being collected include: net and incoming solar radiation, wind speed and direction, snow depth, precipitation, relative humidity, and temperature. All data are transmitted to our lab at the University of Alaska Southeast via wireless modems and are available in real time. In addition, weekly snowpits at the study site provide information about snow temperature, density and stratigraphy. The aim of this study is to test the Crocus snowpack model in this high-latitude maritime snow climate. We present information on: snow-temperature profiles, snow depth, average density, snow water equivalent (SWE), and snow grain metamorphism. Qualitative analysis of the model's simulations and comparison to simultaneous snowpit observations at the study site allowed for an analysis of the model's effectiveness in the snow climate of southeastern Alaska. Results showed the Crocus model is a good predictor of snowpack hydrological parameters such as height of snowpack, SWE, and average density. In comparing the modeled temperature profiles with actual profiles taken at the study site, the model seemed to consistently under-predict the snow temperature. Although somewhat subjective, Crocus snowpack profiles have modeled weak layers within the snowpack, when compared to actual conditions. The implications of this research will lead to improvements in distributed avalanche and hydrological forecasting in the city of Juneau, Eaglecrest Ski area, and other analogous high-latitude, maritime watersheds.

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