

Snow Cover Modelling over Complex Terrain of High Arctic at Point and Distributed Scales

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ABSTRACT

Snow is a critically important and rapidly changing feature of the High Arctic that is significantly influenced by wind redistribution. However, the shortage of information on snow redistribution at fine spatial scales across high latitudes imposes a major limitation on permafrost and climate model projections under climate change scenarios. In this research, we examine the capacity of the physically-based GEOTop model to simulate snow dynamics at the point and basin scales in a tundra landscape on Bylot Island in the Canadian High Arctic. The simulated snow cover was compared with snow depth measured at an automated weather station since 2010. The model reproduced the physical features of snow cover fairly and showed a significant consensus with the recorded data. The result of this study showed significant spatial variability of snow cover due to blowing snow and losses from blowing snow sublimation. Snow cover properties (depth and SWE) were mostly affected by key parameters linked with albedo and by the accuracy of the input precipitation.

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