Post Processing Techniques for better Surface Density Estimates for use in Wildlife Tracking Applications

JACK DECHOW[1,2], MICHAEL DURAND[1,2], LAURA PRUGH[2], JESSICA LUNDQUIST[3], BEN SULLENDER[3], CALLUM CUNNINGHAM[3], CASSIE LUMBRAZO[3], AND KATHERINE BREEN[3]

ABSTRACT

Surface layer snow density has a direct impact on the mobility of wildlife in the winter season. There is a density threshold that determines whether or not a snowpack can support the weight of an animal. Thus, the pathing of wildlife throughout the winter is directly impacted by the spatial distribution of snow density in their habitats. We present two methods to better estimate surface density at scale. First, using a known model to determine bulk density from snow depth, we tune the model parameters with least squares adjustment using depth and surface density data from the ABoVE field campaign. Second, we developed a non-linear state model that steps through the modeling time period and incorporates satellite derived Land Surface Temperature (LST) measurements to better simulate snowpack densification resulting from melt-freeze of the snowpack surface on warm days. For the goal of wide scale wildlife tracking across Washington State, we use the NoahMP snow model within the Land Interface System Framework (LISF) to produce initial estimates of snow characteristics (multilayer density, SWE, depth). The appropriate snow characteristics are used as the inputs to both methods and we present a comparison of results and the implications for wildlife tracking purposes in Washington State.

[1] School of Earth Sciences. The Ohio State University, Columbus, OH, USA
[2] Byrd Polar Research Center, The Ohio State University, Columbus, OH, USA
[3] Civil & Environmental Engineering, University of Washington, Seattle, WA, USA
Corresponding author: dechow.5@osu.edu