Creating a Roadmap for Remotely Sensed Snow Product Feasibility on a Global Scale

VICTORIA LY[1], JESSICA LUNDQUIST[1], AND MELISSA WRZESIEN[2]

ABSTRACT

Remote sensing provides a powerful tool for observing seasonal snow properties on a continuous time-scale and across local, regional, and global spatial scales. Snow products (e.g. SNODAS, GlobSnow, AMSR-E SWE) capitalize on remote sensing data to provide observations on snow cover extent, snow water equivalent, snow depth, albedo, and other snow properties for researchers and resource managers. However, the limitations of snow products as derivatives of optical and passive microwave sensors, while understood, have not been explicitly discussed and mapped. Snow products derived from optical sensors are primarily limited by tree canopy cover and cloud cover. Snow products derived from passive microwave sensors are primarily limited by complex terrain, snow depth, and snow wetness. This paper reviews snow products, identifies the limitations, and provides a first attempt to map the global limitations of optical and passive microwave sensors within Google Earth Engine. We present "snow usability masks" in a graphical user interface, where the user defines the time, spatial extent, and boundary values for parameters, like vegetation, cloud cover, snow wetness etc. The goal is to provide an open-source, easily-accessible system as a roadmap to identify areas with the highest potential of applying snow products for operational and research uses.

---

[1] Department of Civil and Environmental Engineering, University of Washington, Seattle, WA, USA

[2] Department of Geology, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA