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IPWG/IWSSM Meeting
Abstract

High Resolution? Snow Problem

Mountain snow is critically important to human water supply, yet it still remains a significant challenge to measure. Current passive microwave snowfall retrieval algorithms suffer from an information content issue that leads to an underestimation of snowfall in mountainous terrain. Uncertainty in snowfall is currently the largest error in modeling snow on the ground, while unknown snow on the ground poses challenges to the remote sensing of snowfall. Scientists studying fallen vs. falling snow have operated within separate communities and this work uses an interdisciplinary approach to the falling snow problem. Specifically, we use the information content contained within the snow accumulation spatial patterns (~500m) from a SWE Reanalysis (Margulis et al. 2016) dataset to disaggregate the HRRR hourly snowfall. The scaled HRRR snowfall is combined with GPM brightness temperatures and orographic ancillary information to create a training dataset for a snowfall machine learning retrieval algorithm. Compared to HRRR, the SWE Reanalysis has 15-30% more snow accumulation and more consistent topographical spatial patterns. The current algorithm is able to detect snowfall with an accuracy of 90% and continues to undergo testing and validation. Initial results from the machine learning algorithm will be presented along with further improvements. Validation is expected to be conducted on an independent water years' season total snowfall accumulation for the state of Colorado.