Remote Sensing of Snow Estimation: Satellites, Models and Field Experiment

Remote sensing provides local, regional and global observations of seasonal snow, providing key information on snowpack processes. The characterization of intra-seasonal variations of snow pack properties is critical for hydro- meteorological applications. In this presentation, capabilities of current and future satellite sensors, several methods of mapping snow-cover extent, snow albedo, snow grain size, snow water equivalent, melt detection and snow depth using remote sensing will be discussed. Also, we will provide a detailed description and lesion learned from remote sensing experiment (CREST-SAFE) that being carried out since 2011. The primary objective of observations is to monitor seasonal properties of the snow pack through the winter season and their changes with atmospheric conditions, support studies of physical and radiative transfer processes in the snow pack as well as to help validating and calibrating snow retrievals from satellite microwave sensors. The set of instruments installed at the station provides measurements of the snow pack emission at 10.65, 19, 37 and 89 GHz at both polarizations, snow depth, snow water equivalent, snow pack skin temperature, snow pack temperature profile as well as measurements of major meteorological parameters. Effects of changing snow pack properties on the observed microwave emission will be demonstrated and analyzed.