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EVALUATION OF A BLENDED SATELLITE IN-SITU SNOW DEPTH ANALYSIS OVER MOUNTAIN TERRAIN

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ABSTRACT

Operational snow depth analysis is utilized for regional snow assessments over a variety of temporal scales, providing important information to water management planners and policy makers. Another use of snow-depth-based analyses is for initialization of snow states in numerical weather prediction (NWP) models, with implications for predictions of the meteorological atmospheric variables. A blended snow depth analysis based on optimal interpolation of satellite and in-situ data is evaluated over mountain terrain. The method uses a satellite estimate of snow depth as first guess and updates it by blending it with in-situ snow depth from surrounding stations. The technique is applied to snow depth retrieved from AMSR2 onboard the GCOM-W1 satellite and in-situ snow depth obtained from NOAA's Global Historical Climatology Network. Next, the utility of the AMSR2 satellite snow depth and the blended output are evaluated over Western US during the winter months of January and February 2017. To investigate the potential benefit of the technique for NWP model applications, snow depth obtained from NOAA's Global Forecast System is also inter-compared with the satellite and blended outputs. Results indicate that this blending approach greatly enhances the performance of the satellite product over mountain terrain, making it suitable for reliable large-scale snow assessments over these regions. Moreover, the technique generates more accurate blended output compared to forecast snow depth from NOAA's Global Forecast System, demonstrating the benefit of the technique for NWP model applications.

Keywords: snow depth; optimal interpolation; satellite remote sensing; in-situ data