Towards Improved Estimates of Radiative Fluxes at High Latitudes

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Abstract

Most satellite observations of radiances are made at narrow spectral intervals and at particular viewing angles. Two critical elements in the formulation of an inference scheme for radiative flux estimates from such observations are: 1) transformation from narrow-band observations into broadband values (n/b); b) application of Angular Distribution Models (ADMs) to correct for angular anisotropy. Observationally based ADMs are currently available from missions such as the Clouds and the Earth's Radiant Energy System (CERES), however, at high latitudes many viewing directions are under-sampled. To address the under-sampling problem, a hybrid approach is developed whereby new ADMs are synthesized by combining theoretical simulations and CERES observed ADMs. In the simulations, used will be newly available information on high latitude surface types such as, ice, snow, and snow over ice. To evaluate the impact of the new models on surface fluxes, they are implemented in the University of Maryland Surface Radiation Budget Model (UMD/SRB) as driven with satellite observations in areas where ground observations are available for comparison.