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Toward a radiance based assimilation framework for the retrieval of SWE and snow depth from AMSR-E and SSM/I data

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The capabilities of space-borne brightness temperatures to retrieve snow parameters such as snow depth and water equivalent (SWE) have been widely investigate in the literature. Techniques based on a linear relationship between the measured brightness temperatures and snow depth or SWE have been widely used. Recently adopted operational algorithms (e.g., AMSR-E SWE, September 2005) suggest the use of dynamic coefficients for relating measured brightness temperatures and snow depth, with the use of low frequencies (e.g. $\sim$ 10 GHz), not present in the past algorithms. Other possible approaches can be based on sophisticated electromagnetic models which account for the physics of the problem and for the potential deriving from multi-temporal information.

In this talk, we will analyze the potential of dynamic approaches for improving the retrieval of snow depth, and SWE consequently, from spaceborne microwave data. In particular, we will report results regarding the modeling of spaceborne brightness temperatures by means of a very simple snow evolution model and will show its advantages and limitations. We will also show results derived from a 'new generation' of linear regression approaches, in which the coefficients are dynamic in space and time and the results of an effort aimed at developing a radiance based assimilation

framework, here shown in its preliminary version.