



Cumulative Distribution Function based framework for C-SAR based retrieval of soil moisture and canopy properties

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We propose an approach for estimating soil moisture canopy properties over corn fields using C-band SAR data acquired by RADARSAT-2 satellite. The approach is based on employing the absolute difference between like and cross polarized signals (ADLC) for segmenting the canopy growth cycle into tiny stages. Hence, the Cumulative Distribution Function (CDF) transformation of the like polarized backscatter of each stage is used for quantifying both soil and vegetation contributions to the backscatter. The soil contribution, then, employed for inversely running Oh model and the water cloud model by which soil moisture and, canopy water content and height are estimated respectively. The proposed framework shows satisfactory performance where high correlation of determination (R^2) is detected between the field observations and the corresponding retrieved soil moisture, canopy water content and canopy height ($R^2 = 0.64, 0.97$ and 0.98 respectively). Soil moisture retrieval is associated with root mean square error (RMSE) of $0.03 \text{ m}^3 \text{ m}^{-3}$ while estimating canopy water content and canopy height have RMSE of 0.38 kg m^{-2} and 0.166 m respectively.