

Soil moisture retrieval under wheat crop using RISAT-1 hybrid polarimetric SAR data

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ABSTRACT

The study aims to retrieve soil moisture from RISAT-1 hybrid polarimetric SAR data. Although the use of linear polarimetric SAR data has been well understood and documented, but hybrid polarimetric SAR data is grossly under explored and under reported for this purpose. Regression analysis has been carried to develop soil moisture retrieval models and validated the same. The retrieval models have been developed from back scattering coefficients (σ_{RH} & σ_{RV}) and m- δ space decomposition parameters (even bounce, odd bounce, and volume component) generated from RISAT-1 hybrid polarimetric SAR data. A total of three models are analyzed in this work, (i) using both σ_{RH} & σ_{RV} , (ii) volume component, and (iii) using even bounce, odd bounce and volume component. The study results showed that the model using m- δ decomposition derived parameters can provide better accuracy with R^2 and RMSE of 0.92 and 2.45 per cent respectively in comparison to other two models.

Keywords : Hybrid polarimetry, m-delta decomposition, RISAT-1 SAR, soil moisture, wheat crop