

عنوان مقاله:

Estimation of Soil Moisture for Different Crops Using SAR Polarimetric Data

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خلاصه مقاله:

Soil moisture is an essential factor that influences agricultural productivity and hydrological processes. Soil moisture estimation using field detection methods takes time and is challenging. However, using Remote Sensing (RS) and Geographic Information System (GIS) technology, soil moisture parameters become easier to detect. In microwave remote sensing, synthetic aperture radar (SAR) data helps to retrieve soil moisture from more considerable depths because of its high penetration capability and the illumination power of its light source. This study aims to process the SAR Sentinel-1A data and estimate soil moisture using the Water Cloud Model (WCM). Many physical and empirical models have been developed to determine soil moisture from microwave remote sensing platforms. However, the Water Cloud Model gives more accurate results. In this study, the WCM model is used for mixed crop types. The experimental soil moisture was determined from in-situ soil samples collected from various agricultural areas. The soil backscattering values corresponding to the different soil sampling locations were derived from Sentinel SAR data. Using linear regression analysis, the laboratory's soil moisture results and soil backscattering values were correlated to arrive at a model. The model was validated using a secondary set of in-situ moisture content values taken during the same period. The  $R^2$  and RMSE of the model were observed to be 0.825 and 0.0274, respectively, proving a strong correlation between the experimental soil moisture and satellite-derived soil moisture for mixed crop field types. This paper explains the methodology for arriving at a model for soil moisture estimation. This model helps to recommend suitable crop types in large, complex areas based on predicted moisture content. Doi: 10.28991/CEJ-2023-09-06-08 Full Text: PDF

کلمات کلیدی:

.Water Cloud Model (WCM); Synthetic Aperture Radar (SAR); Soil Backscattering

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