

Accepted Manuscript

Soil Moisture Retrieval Using Ground based Bistatic Scatterometer Data at X-band

Dileep Kumar Gupta, Rajendra Prasad, Pradeep Kumar, Ajeet Kuamr Vishwakarma

PII: S0273-1177(16)30675-5
DOI: <http://dx.doi.org/10.1016/j.asr.2016.11.032>
Reference: JASR 12989

To appear in: *Advances in Space Research*

Received Date: 22 January 2016
Revised Date: 19 November 2016
Accepted Date: 23 November 2016



Please cite this article as: Kumar Gupta, D., Prasad, R., Kumar, P., Kuamr Vishwakarma, A., Soil Moisture Retrieval Using Ground based Bistatic Scatterometer Data at X- band, *Advances in Space Research* (2016), doi: <http://dx.doi.org/10.1016/j.asr.2016.11.032>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Soil Moisture Retrieval Using Ground based Bistatic Scatterometer Data at X- band

Dileep Kumar Gupta, Rajendra Prasad, Pradeep Kumar, Ajeet Kuamr Vishwakarma

Department of Physics, Indian Institute of Technology (B.H.U.), Varanasi

Email ID of Corresponding Author: rprasad1@rediffmail.com

Abstract

Several hydrological phenomenon and applications need high quality soil moisture information of the top Earth surface. The advent of technologies like bistatic scatterometer can retrieve soil moisture information with high accuracy and hence used in present study. The radar data is acquired by specially designed ground based bistatic scatterometer system in the specular direction of 20° to 70° incidence angles at steps of 5° for HH and VV polarizations. This study provides first time comprehensive evaluation of different machine learning algorithms for the retrieval of soil moisture using the X-band bistatic scatterometer measurements. The comparison of different artificial neural network (ANN) models such as back propagation artificial neural network (BPANN), radial basis function artificial neural network (RBFANN), generalized regression artificial neural network (GRANN) along with linear regression model (LRM) are used to estimate the soil moisture. The performance indices such as %Bias, Root Mean Squared Error (RMSE) and Nash-Sutcliffe Efficiency (NSE) are used to evaluate the performances of the machine learning techniques. Among different models employed in this study, the BPANN is found to have marginally higher performance in case of HH polarization while RBFANN is found suitable with VV polarization followed by GRANN and LRM. The results obtained are of considerable scientific and practical value to the wider scientific community for the number of practical applications and research studies in which radar datasets are used.

Keywords: Soil moisture; Microwave remote sensing; BPANN; RBFANN; GRANN; Regression analysis

1. Introduction:

Soil moisture is an important variable for hydro-meteorological applications and has significant effect on catchment water balance, water yield, groundwater recharge, and storage (Al-Shrafany

Download English Version:

<https://daneshyari.com/en/article/5486282>

Download Persian Version:

<https://daneshyari.com/article/5486282>

[Daneshyari.com](https://daneshyari.com)