

## ***Interactive comment on “Relating surface backscatter response from TRMM Precipitation Radar to soil moisture: results over a semi-arid region” by H. Stephen et al.***

### **Anonymous Referee #2**

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The use of C-band scatterometer data in soil moisture estimation has been well documented in the literature, however, the use of Ku-band has not found the same attention. This paper undertakes to provide new insight into the dependence of TRMMPR Ku-band backscatter on surface soil moisture content. A model is formulated to retrieve soil moisture content and is subsequently calibrated and validated using simulated and measured soil moisture values. My comments are listed below:

Penetration depth of a bare soil layer at Ku band is  $\sim 2$ cm (depending on how dry the soil is), and indeed significantly less when the soil is covered by (even sparse) vege-

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tation. I am concerned about the accurateness of using model derived soil moisture values from the top 10cm of the soil layer to calibrate and validate the authors own model which at best only accounts for soil moisture values to a depth of ~2cm.

In the introduction, the importance of soil moisture information is discussed but little mention is given to the uncommon use of Ku-band in this area. Studies such as:

MORAN, M., VIDAL, A., TROUFLEAU, D., INOUE, Y. & MITCHELL, T. (1998) Ku- and C-band SAR for discriminating agricultural crop and soil conditions. *IEEE Transactions on Geoscience and Remote Sensing*, 36, 265-272. SANO, E. E., MORAN, M. S., HUETE, A. R. & MIURA, T. (1998) C-and multiangle Ku-band synthetic aperture radar data for bare soil moisture estimation in agricultural areas. *Remote Sensing of Environment*, 64, 77-90. RINGELMANN, N., SCIPAL, K., BARTALIS, Z. & WAGNER, W. (2004) Planting date estimation in semi-arid environments based on Ku-band radar scatterometer data. *Geoscience and Remote Sensing Symposium, 2004. IGARSS '04. Proceedings. 2004 IEEE International.*

could be referred to where Ku-band was used and various results achieved (even though the 1st two use SAR, their conclusions could still be of interest in terms of vegetation attenuation)

Vegetation in semi-arid regions (tend to be 'spiny' and shrubby) is very different from that where 'common' soil moisture experiments using microwave sensors has been performed. Does this vegetation type facilitate using Ku-band in such environments?

Technical Comments: Page 6427, could add in here that SMOS has been successfully launched.

Page 6428, line 13, add references.

Page 6429, line 16 is essentially repeated in line 25

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Interactive comment on *Hydrol. Earth Syst. Sci. Discuss.*, 6, 6425, 2009.