

Interactive comment on “Surface soil moisture estimates from AMSR-E observations over an arid area, Northwest China” by L. Wang et al.

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The paper “Surface soil moisture estimates from AMSR-E observations over an arid area, Northwest China” by Wang et al., is an attempt to use AMSR-E data over a region with high degree of soil and topographic variability. Consequently, this is a difficult task given that most forward models for radiative transfer in the microwave region have been developed and tested for plains with low topographic detail. The paper itself is poorly written, this reviewer has listed several instances where the language is grammatically incorrect. The methodology in the paper is also difficult to understand as the key element of treatment of vegetation optical depth in the actual soil moisture retrieval step is unclear. The way this reviewer understands it, vegetation opacity has been coupled with the surface roughness parameter ‘h’. The reviewer suspects this from the

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statement “Therefore, some investigators combined the two effects into one parameter to conduct temporal dynamics of vegetation water content (Njoku and Chan, 2006) and surface soil moisture (Jin and Yan, 2007)” made by the authors in the manuscript. Assuming that is the case, it is incorrect to take ‘h’ as annually invariant since the authors have focussed on the growing season and during the growing season vegetation varies considerably in its structure, leaf area index and spatial extent. Thereby a uniform ‘h’ value for the entire year does not make sense. The authors also intend to account for the sub footprint topographic variability by calibrating for the ‘h’ parameter. However at the end of the methodology section they state “Considering the continuity of the h distribution and that the non-bare areas are mostly related to steep mountains, we pre-disposed empirically the value of the h parameter as 0.6”. Steep areas are where all the topographic diversity is! The validation of results it seems is only in the areas of low topography as the distribution of meteorological stations (Fig 1) seems to indicate. The authors are suggested to make this clear in the paper that they have not tested their model in regions with steep topography and further need to clarify how they account for topographic variability if indeed ‘h’ is fixed at 0.6 for steep slopes. In light of lack of clarity about how vegetation opacity is retrieved, this reviewer does not see any new contribution made by this paper and suggests that the authors resubmit the paper after a comprehensive rewrite. More satellite data could be utilized to improve this paper, in particular, vegetated / bare region classification using MPDI should be validated using MODIS or such other land cover datasets. Some specific error are listed below.

Pg 1056, Line 4: ‘used to conduct 7 years of ..’ does not make sense. Please change to ‘used to obtain 7 years of ...’ or similar.

Pg 1056, Line 9: ‘over the study area, we have to present ..’ does not make sense. Please change to ‘over the study area, we present ..’

Pg 1056, Line 13: Change ‘evolutions’ to ‘evolution’

Pg 1056, Line 17: Change ‘reprehensive’ to ‘representative’

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Pg 1056, Line 17: Change 'indicate there has a ...' to 'indicate there is a ..'

Pg 1057, Line 2: Change 'previous researches have shown ..' to 'previous research has shown ...'

Pg 1057, Line 2: Change 'are defines as ..' to 'are defined as ...'

Pg 1066, Line 14: Change 'dries' to 'driest'

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 1055, 2009.

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