

Interactive comment on “Potential soil moisture products from the Aquarius radiometer and scatterometer using an observing system simulation experiment” by Y. Luo et al.

Anonymous Referee #1

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This study investigates the potential soil moisture retrieval capacity of NASA's Aquarius radiometer and scatterometer (both at L-band frequencies) instruments in an Observing System Simulation Experiment (OSSE) framework. The OSSE consists of Noah land surface model, Microwave Emission and Backscatter Model (MEBM), Orbit and Sensor Model (OSM) and Retrieval Model (RM). The OSSE is carried out over 1000 x 2200 km² area in Central USA from September 2002 to September 2003 at 0.125 degree spatial resolution. The results are presented from 6 am (local time) simulations which is the overpass time of the satellite. The results indicate that the radiometer

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outperforms the scatterometer over the scattered vegetation regions though both the instruments capture the soil moisture values and temporal dynamics realistically. Vegetation coverage plays a major role in soil moisture retrievals and both the instruments perform poorly over the densely vegetated regions.

This work is both novel and relevant, and I recommend it be published after addressing one “minor comment”. In particular, the authors do a good job of communicating the potential pros and cons of both radiometer and scatterometer aboard the Aquarius satellite through a properly designed OSSE.

General Comments: (1) I have one comment: In Figure 4(b), I notice that the radiometer (open circles) shows higher soil moisture estimates (uncertainties) during winter months (from mid-October till April). The vegetation is typically sparse in winter months and the vegetation cover has less impact on soil moisture retrievals in the winter months than summer months over snow-free regions. So, what is the cause of high uncertainties noticed in the radiometer retrievals in winter months? On the other hand, if you remove the retrievals in the winter months and calculate the error statistics only for summer months, then the radiometer will have less error values which indicate that the vegetation cover is not the factor that affects the radiometer measurements. Is it the case?

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