We appreciate your interest in our work and the comments and suggestions you provided. Below are your questions/comments and our responses:

1) In the cross-correlation analysis among the three different data sets it is clearly shown that the AMSR-E soil moisture product is not well correlated with in situ observations at SCAN sites (and likely also with modeled data from Noah). The average correlation in the East area is only 0.19. This result, besides the expected lower accuracy of satellite observations, can be mainly attributed to the different depth of investigation of AMSR-E (<2 cm) with respect to Noah (10 cm) and in situ (5 cm) observations. Therefore, it is very likely that most of the statistical differences observed in the paper between AMSR-E and SCAN/Noah data can be linked to this issue.

The low correlation of AMSR-E retrievals with SCAN soil moisture is reflected in both their daily and seasonal variability. Figure 4 shows that AMSR-E retrievals did not respond to seasonal variation of ET as they did not decrease as SCAN and Noah soil moisture estimates did in the summer months. Whether this is the true behavior of soil moisture at 1~2 cm is unknown since we do not have in situ measurements at this shallow depth. However, we do know that the sensitivity of brightness temperature to soil moisture decreases as vegetation water content increases, which makes the accurate retrieval of soil moisture unlikely (Jackson, 1993). This reduced sensitivity may be responsible for the lack of seasonality in AMSR-E soil moisture. The lack of correlation with daily precipitation (and so daily SCAN soil moisture) in AMSR-E retrievals may be attributed to the shallow sensing depth of X-band brightness temperatures as shown by Jackson (1993). We will emphasize the shallow sensing depths of AMSR-E as one of the reasons for the bias between AMSR-E and SCAN in the revision.

Such biases, regardless of their causes, are directly responsible for the behavior of the higher moments of AMSR-E retrievals, such as the positive correlation between spatial variability and mean soil moisture in all climate regions. However, we like to emphasize that the difference in sensing depths did not affect the conclusion of this study, i.e., spatial mean soil moisture plays a critical role in higher moments of soil moisture.

2) I would prefer the analysis reported in Figure 7 to be changed as it was done in Figure 6. Specifically, it will be clearer (at least for me) if the standard deviation at SCAN sites and at all grid points is compared as it was made for the mean values (Figure 6). Moreover, it is not clear to me if the data plotted in Figures 2, 3 and 5 for Noah and AMSR-E data refers to all grid points or only the points containing the SCAN sites. Please specify better.

Yes, a similar scatter plot can be added to Figure 6 to include soil moisture standard deviation at all grid points versus that at SCAN locations. Captions for figures 2, 3, 4 and 5 will be revised to explicitly state that the statistics were calculated based on data at SCAN locations.

Minor comments

1) P10254, L18-21: I would like to note that in Brocca et al. (2007, JoH) it was shown in Figure 1 exactly the same result. Indeed, Brocca et al. (2007) analyzed several studies in contrasting climatic regions obtaining that in dry areas the soil moisture variance increases with mean soil moisture and in wet areas the opposite occurs.

Sure, we will include results from Brocca et al. (2007) and others to strengthen the arguments.

2) P10262, L14: Please change "anomalous soil moisture" with "soil moisture anomalies"

Will do.

3) Figure captions: I note that, in the figures, soil moisture is expressed in volumetric terms (m_3/m_3) and not in volumetric percentage (see also page 10253, line 5). Please correct.

They should be cm^3/cm^3.