**hessd-8-C578-2011, Comments by Anonymous Referee #2**

The paper introduces a soil moisture observatory on the Tibetian plateau that can be used for the validation of satellite soil moisture products. In particular the paper presents also first intercomparisons of three different satellite remote sensing products against the in situ measurements. The major conclusion of the paper is that satellite soil moisture products provide useful information about temporal soil moisture dynamics but have considerable problems in cold regions. Overall the paper is well written. My major concerns with the paper is that the data analysis performed is rather limited and it remains unclear if the conclusions drawn by the authors are in general valid (details below)

***Response: We wish to thank this reviewer for the constructive and detailed comments. A point by point response is provided below.***

Major remarks:
1. The authors present the different coarse scale soil moisture products in section 3, without giving much detailed information about the algorithms, but providing the necessary external references. However, insection 4.1, more details on the algorithms are discusse e.g. p. 257. The paper would benefit of a clearer structure of methods and results.

***Response: We have removed the ITC model part and added some SMOS data that became available recently and structured the methods and results consistently. Please see also response to Reviewer 1.***

2. Inconsistent treatment of test sites: While authors provide quantitative estimates of the error of the different products for the Maqu network, not information on RMSE/correlation is provdied for the Naqu network.

***Response: We have added two new tables 4&5 to address this point. All data available from both networks are evaluated.***

3. The soil moisture data presented in Fig. 3 exeeds by far a value of 0.5 which is a physical limit of soil moisture for most of the soils. The ASCAT soil moisture data is much higher than this value. Do authors have an explanation for this behaviour? From a theoretical point of view, the

ASCAT soil moisture data should scale between the wilting point and the field capacity for the particular soil considered.

***Response: We thank the reviewer for pointing out this important issue. A detailed response to this same issue has been given to the comment by Dr. Wagner. In brief, we have reevaluated the results and have studied in details the soil texture information used to convert ASCAT relative to volumetric soil moisture. We have changed to use the porosity information from the Reynolds data for consistency because several retrievals and models (e.g. GLDAS, and AMSR-E data as evaluated here) also use this database.***

***We would like to point out that we have used the porosity and absolute dry soil (zero volumetric soil moisture) to scale the relative soil moisture to volumetric soil moisture. We do realise that in the Maqu network area, the soil moisture has a range of values from 0.1 ~ 0.2 $m^3/m^3$ under frozen conditions and if site-specific conversion is used, better agreements would result, however our purpose is to evaluate if satellite data can be used for regional to large scale analysis and in that case, there is no possibility to carry out site specific conversion in general. Please see also response to reviewer 1. The use of field capacity and wilting point can be problematic because the definitions of either is arbitrary and in particular the wilting point concept is related to vegetation water use and not to the absolute water content in the soil which is what a microwave sensor measures in terms of dielectric constant.***

4. The authors illustrate large differences between the different data products as well as the in situ observations. While RMSE and correlation between in situ data and satellite observations are provided for one of the test sites, the overall data analysis is rather limited in the paper and basically presented in two figures (Fig. 3, Fig.6). It remains unclear where the large discrepancies between in situ observations and satellite data come from. In the way the results are presented, the conclusions remain rather qualitative. The data presented in the paper is also limited to a few months in 2008. Why is the analysis limited to a single year and why are no results for more recent years (2009/2010) presented?

***Response: We agree to these observations and have improved the data analysis. We have analyzed now all available data to us (in-situ and satellite data) and calculated statistics as given in Table 4 & 5. Data from Naqu are limited due to the lack of satellite products in winter period, but our conclusion remain valid when new data are added and analyzed for the Maqu network area (Figure R3 &R4). We have used 205 in-situ data points for AMSR-E data and 144 for ASCAT-L2 data analysis in the Naqu network area and similarly 684 in-situ data points for AMSR-E and 541 for ASCAT-L2 in the Maqu network area. Given the spatial variability of the in-situ data as quantified by the variance (standard deviation), there is little doubt that the large discrepancies originate from the satellite products.***

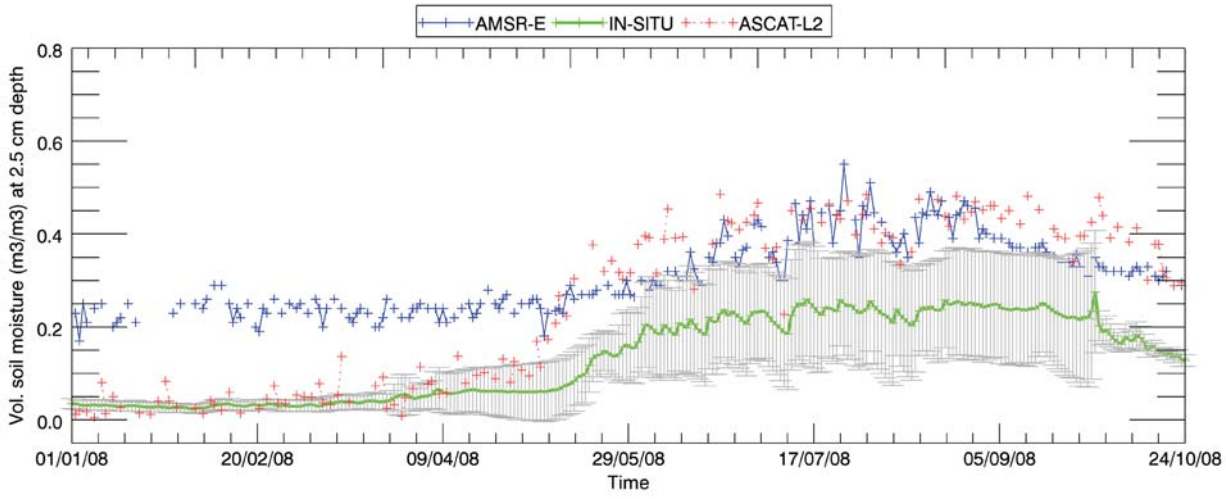


***Figure R3. Comparison for the Naqu network area.***

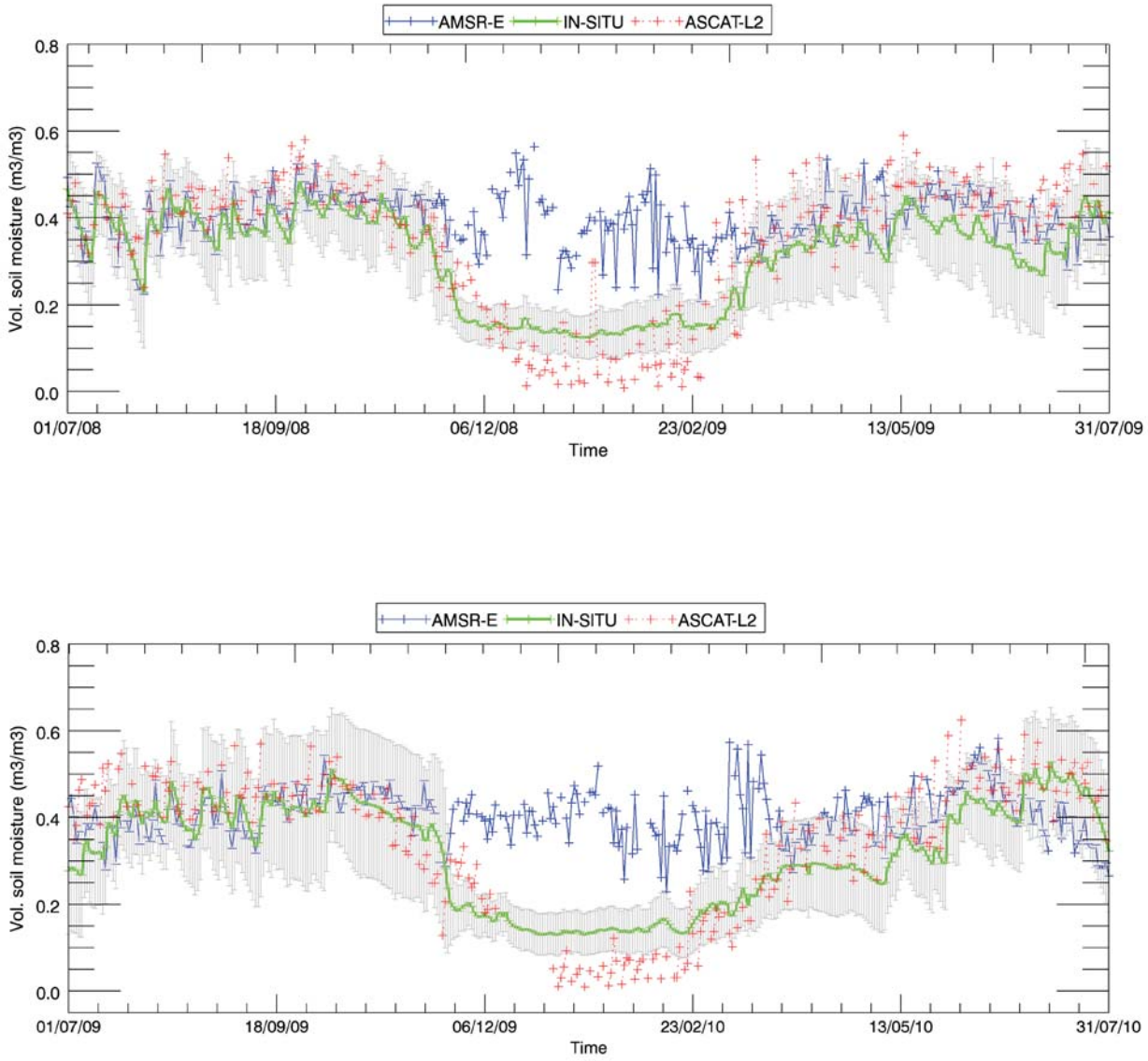


***Figure R4. Comparison for the Maqu network area.***

Minor remarks:

• provide significance information with correlations

***Response: We have added two tables with detailed statistics.***

• Fig3 and Fig6 do not provide muich details about the presented data. It remains unclear how well the different satellite data products capture the temporal dynamics.

***Response: In Figure R4 two complete annual cycles are shown. The temporal dynamics is captured well in monsoon seasons.***