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Evaluation of ASCAT, FY-3B and AMSR2 Soil Moisture Retrievals Using Automatic In-situ Observations over China

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Evaluating satellite soil moisture products is very important for developing / improving soil moisture retrieval algorithms and estimating observation errors in land data assimilating, meanwhile it is also a challenging work because of the lack of ground measurements and the spatial heterogeneity of soil moisture. China Meteorological Administration (CMA) have been establishing Chinese automatic soil moisture observation network since 2009. More than 1500 stations were put into operation till September 2013. In this study, we intend to evaluate three satellite-based soil moisture products using the automatic in-situ observations at 10cm during 2012 to 2013 over China. The three products were the level 2 surface soil moisture retrievals from the Microwave Imager aboard the Chinese FengYun (FY) 3B satellite, the level 2 surface soil moisture retrievals from the advanced microwave scanning radiometer 2 (AMSR2) onboard the GCOM-W1 satellite and the normalized surface soil moisture estimates derived from active microwave data of the ASCAT scatterometer instrument onboard MetOp satellite.

A strict quantity control is given to in-situ observations including break / jump point, frozen and soil moisture - precipitation relationship checking. The location of a certain in-situ observation station and the corresponding grid which this station falls in are considered as a location-matched pair for the comparison. The quantity controlled in-situ observations are taken as ground ‘truth’. The comparisons are carried out separately for the upward and downward track of these three satellite products. The relationship of satellite products performances and vegetation coverage are also analyzed.