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Hydrology and Earth System Sciences Discussions

Interactive comment on "Accounting for seasonality in a soil moisture change detection algorithm for ASAR Wide Swath time series" *by* J. Van doninck et al.

W. Wagner

ww@ipf.tuwien.ac.at

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This is a well written paper which describes the – to my knowledge – first independent application and model improvement of the change detection algorithm developed by our radar team at TU Wien for the Global Monitoring (GM) mode of the ENVISAT Advanced Synthetic Aperture Radar (ASAR) (Doubkova et al. 2011; Pathe et al. 2009). This algorithm is a simplified version of the change detection method used for deriving soil moisture from METOP ASCAT and ERS SCAT (Naeimi et al. 2009; Wagner et al. 1999b) and, so far, neglects seasonal vegetation effects on the backscattered signal.

But of course, one would expect retrieval errors due to this simplifying assumption. This problem is one of the starting points for Van dononck et al. (2011) who investigated methods of how to account for seasonal vegetation effects in the model parameters. Their results are very much in line with our own experiences and I therefore recommend publishing the paper after some minor revisions.

In the revision I would be pleased if the authors could address the following points:

1) For comparison with an independent satellite soil moisture product, the authors chose the AMSR-E soil moisture product of NASA (Njioku). However, it is well known that over Europe other satellite products show a much better performance. It is thus recommended to either use e.g. the AMSR-E product of VUA-NASA or the ASCAT product of TU Wien-EUMETSAT.

2) Page 10348, lines 3-6: Is it really the case that the vegetation has more effect on backscatter in winter than in summer in this area? While optical vegetation indices may indeed indicate more vegetation "greenness" during the winter period, I am not sure if this is also true for the wet vegetation biomass that has a more direct impact on the backscatter measurements.

3) Page 10348, line 13-16: This point is related to the one above: The statement that soil moisture may have a stronger impact on the slope (angular correction coefficient) than vegetation is in direct contradiction to the basic assumptions of the change detection model as applied to the scatterometer data, see e.g. Wagner et al. (1999a).

4) Page 10348, lines 28 ff: I agree that a correct description of the slope is extremely important for model. The reason why Pathe et al. (2009) and Mladenova et al. (2010) argue that the noise is too high to detect seasonal changes is the high noise of the ASAR GM data which exceeds the noise level of the ASAR WS data as used by the authors.

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