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.

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Reviewer comment: 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.

Reply: Other soil moisture products will be included (see reply to first comment by L. Brocca).

Reviewer comment: 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.

Reply: Many cropland (mainly wheat) pixels, especially in the eastern part of the study site (Crotone province), are barren during large part of the summer, so that the effect of vegetation on backscatter is zero in summer (apart maybe from the possible influence of wheat stubble). We therefore believe that NDVI is –at least over the lowland cropland pixels, where the angular correction coefficient shows the largest difference between winter and summer months– a good indicator of wet vegetation biomass.

Reviewer comment: 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).

Reply: This statement is indeed in contradiction with the assumptions of the change detection method, but is supported by the results of the seasonal angular correction coefficient derivation. It is however possible that this is an artefact caused by the rather arbitrary division of the year in a winter and summer period of six months each. This might cause the summer half year to include periods at the beginning or end of the growing season. As stated in the article, a more strict division between low vegetation/high vegetation periods is advisable but, in this study, hampered by the limited size of the image dataset. We will include these consideration in the revision.

Reviewer comment: 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.

Reply: This part will be adjusted and the difference between the GM and WS noise level will be addressed.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 10333, 2011.

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