

## ***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.***

**J. Van doninck et al.**

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Reviewer comment: Firstly, at page 10346, lines 10-12 it is written that no validation studies were carried out in Calabria region and an in situ soil moisture network does not exist. However, five soil moisture stations have been operating since 2001 in the Calabria region and the data are freely available on the International Soil Moisture Network website (<http://www.ipf.tuwien.ac.at/insitu/>, Dorigo et al., 2011). Additionally, Brocca et al. (2011) carried out a validation study of different soil moisture products derived by ASCAT and AMSR-E sensors also using the soil moisture data from the soil

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moisture network in Calabria. I suggest considering this data set for the validation of the BEACH model.

Reply: Thank you for pointing out the existence of the in situ stations and the recent validation study. We will evaluate whether these in situ data can be used to validate the BEACH model. Reference to the validation study will be included in the revised manuscript. We noticed that this validation study confirms our finding that the NASA AMSR-E soil moisture product performs poorly over Calabria. In the revised manuscript, we will include a comparison with other algorithms or sensors (AMSR-E VUA and/or ASCAT). We noticed, however, that in the AMSR-E VUA product the south-western half of Calabria is masked, likely due to the proximity of the sea.

Reviewer comment: Secondly, the BEACH model was calibrated considering data at 10 cm depth and, hence, the simulated soil moisture data are representative of this layer depth. I believe that this layer is too deep to be contrasted with ASAR soil moisture estimates representative of a layer of 2-5 cm. I suggest discussing this aspect and, if possible, decreasing the layer simulated by the model to have a more coherent comparison.

Reply: We acknowledge that the layer of 10 cm over which soil moisture has been modelled is larger than the depth of ASAR soil moisture estimates. However, modelled soil moisture cannot be validated for a depth of 2-5 cm since in situ measurements at this depth are lacking. Some extra emphasis will be given to this error source in the revised manuscript.

Reviewer comment: Finally, the reference to Vahedberdi et al. (2009) for the BEACH model is wrong. Vahedberdi is the name, the surname is Sheikh (Sheikh et al., 2009).

Reply: The reference has been corrected

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