**Ocean Science
Discussions**

Interactive
Comment

Interactive comment on "Sea surface freshening
inferred from SMOS and ARGO salinity: impact of
rain" *by* J. Boutin et al.

Anonymous Referee #3

Received and published: 21 November 2012

General comments:

In this paper, authors investigate the possibility to infer the sea surface freshening from
SMOS and ARGO salinity measurements. After explaining first the context of the study,
then the ingredients used and the employed methodology, they show the importance of
having SSS variability from satellite and in-situ measurements compared to climatology
in particular during rainy events. They discuss about the limitation of the retrieved SSS
and argue on several parameters able to play a significant role or not. They found
a linear correlation between the SMOS freshening and SSM/I rain rate. Finally they
recommend to use satellite measurements only in non-rainy conditions.

Specific comments:

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1.Data and Method §2.3 About SSM/I RR, I suggest to the authors to give an observation error for this particular area. It should be useful to have the accuracy of the RR retrieval compared to the estimated errors of geophysical variables involved in the SSS retrieval algorithm. 2.Error source P. 3342 between line 5 and line 15. This section seems unclear, maybe because the effect is not well known in the L-band Tb? P. 3342, line 19. Retrieved SMOS wind speed is mentioned for the first time. Maybe a reference could be useful to understand where this measurement comes from, is it inferred from the multiangular and position information mentioned P3335 (line10-11)? Is it really a wind speed retrieval? P3343 (line 1-5), About the SST cooling, maybe it will be interesting to compare SST used by SMOS SSS retrieval and SST measured by ARGO (if it exist) and/or SST from satellite. Here, you could mention the SST used in the SMOS SSS retrieval and the associated error.

Technical corrections:

Just few comments on the ARGO OI reference which is a bit confusing. The figure caption 1 uses ARGO OI whereas ARGO SSS interpolated map is mentioned on the figure 1. Moreover, in the text, ARGO SSS is refereed to ARGO float salinity data but we often find out ARGO single SSS. In addition ISAS appears on Figure 2 whereas it has never been defined (It seems to refer to ARGO OI). Please, once it has been named, use the good reference in all text.

Interactive comment on Ocean Sci. Discuss., 9, 3331, 2012.

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