AMTD 8, 4049-4093, 2015
Item-by-item reply to Referee #2

Referee: yellow text
Authors: plain text

This manuscript presents case study results of the surface temperature and emissivity retrieval of the SEVIRI data using a Kalman Filtering approach, following a published paper on the method techniques. The manuscript is concise and well structured with solid science and supporting images/plots/tables. The scientific and technical details are also well cited. Accurate emissivity determination is always a problem bothered land surface temperature community. This manuscript presented a practical solution that is promising in the case studies. I believe the manuscript should be published with minor corrections.
We thank the referee for the appreciation of the paper and for the useful comments and remarks.

Some Weakness: Implementation details are NOT well given, makes it not clear in 1) how the multiple SEVIRI observations are needed (e.g. how many times, temporal difference between the observations and their restriction, etc.) 2) Impact of the forward model parameterization and identity assumption of the dynamical model operator to the retrieval results. Some discussions should be given: 1) Physics of the threshold values of the Kalman filter recursive process and its impact to the retrievals. 2) Any restriction of the temporal step set (of the multiple observations) or its impact to the retrievals 3) Sensitive analysis of the Kalman Filter application to the surface temperature and emissivity retrieval. 4) Quality requirement of the background emissivity determination and its impact to retrievals.
This is fair comment. However, all the points and issues raised by the referee have been already addressed in previous studies and are available online. As already done in the paper we refer the interested reader to
Masiello et al 2103 doi:10.5194/amt-6-3613-2013;
Serio et al, 2013, DOI: 10.13140/RG.2.1.2017.7442;
Serio et al, 2014, DOI: 10.13140/RG.2.1.4898.5120
The paper wants to focus on aspects of validation and inter-comparison; work already done has been synthesized and properly referenced. Also following referee suggestions made later in his review, we have expanded the introduction section to clarify aims and scope of the present study. Furthermore, section 4 will be expanded to include more details on the settings used for the implementation of the KF scheme used in the study.

Some detail comments:

Page 2, Line 17, “we have that emissivity retrieved . . .” should be “we have found that emissivity retrieved ..”
We will change as suggested

Page 3, Line 18, It may be not exactly to say “largely relies on statistical retrieval schemes”. Many approaches are physically based, like MODIS day/night algorithm, ASTER TES algorithm, TISI and ISSTES.
We will rephrase.

Page 7, Line 10, “is derived form the University...” should be “is derived from the University...”
We will change as suggested.

Page 8, Line 24, “which the reader could refer to for further details” Page 8, the last paragraph should be put into the Introduction section.
This part will be moved to the Introduction section.

Page 12, Compared with the Gobabeb station, Evora station is not an optimal validation site for its large heterogeneity. The uncertainty of in situ measurements should be evaluated and would be helpful to the validation.
We think that we have warned the reader of the difficulty involved with Evora validation station. This is why we also used Gobabeb. In addition, the case studies for Evora has also involved an inter-comparison with LSA SAF products for surface temperature. We think that the assessment of the quality of in situ data is an important task. Ermida et al. (2014)

(reference list in the paper) presented a methodology to fully explore the Evora in situ observations leading to ground LST estimates at pixel scale with an uncertainty of about 0.6ºC.

Page 13, Last paragraph, the time series vegetation emissivity did follow the seasonal vegetation cycle, compared with green vegetation, dry one have lower emissivity for band 10.8 and 12μm. But there are no evidence in ASTER spectral library that could verify dry grass have larger emissivity at 10.8μm than 12μm.

The referee is right. In fact, the evidence is for channel at 8.7 μm against both 10.8 μm and 12 μm (see Fig. 1 in this reply). We have corrected in the revised paper.

Page 15, the second paragraph, 10.8μm band yields a good emissivity result, what about the other two bands?

We focus on 10.8μm because this is the emissivity used within the LSA-SAF algorithm. For the year 2007, a more comprehensive comparison will be shown with UW-BFEMIS data base and extended to the three window channels.

Page 17, Line 20, "This can be explained because the AVHHR OI SST is a..." should be "This can be explained because the AVHRR OI SST is a..."

We will correct in the revised version.

Charts and figures comments:

Figure 5 and 9, 1) the captains of these two figures should indicate the station name, "Monthly mean difference" should be "Monthly mean surface temperature difference"

We will correct and change as suggested.

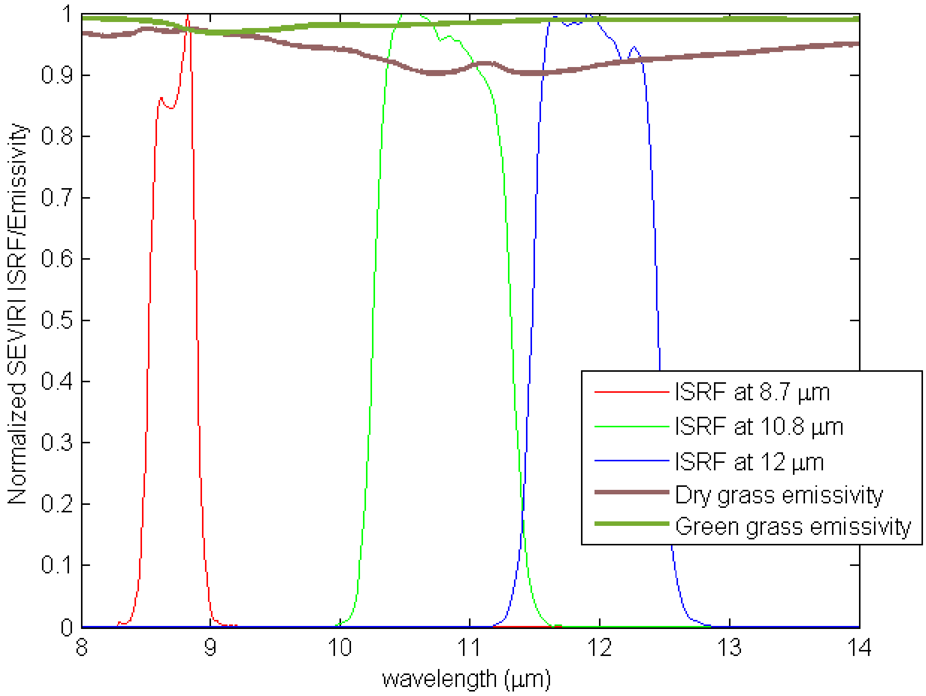

Fig. 1 (not shown in the paper). Comparison of dry and green grass emissivity. The figure also shows the SEVIRI Instrumental Spectral Response Function (ISRF). According to this behavior we have that in summertime the emissivity at 8.7 µm is higher than those at 10.8 µm and 12 µm, in agreement with the KF retrieval shown in Fig. 7 (paper).