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Interactive comment on "Kalman filter physical retrieval of surface emissivity and temperature from SEVIRI infrared channels: a validation and inter-comparison study" *by* G. Masiello et al.

Anonymous Referee #2

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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.

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.

Some detail comments:

Page 2, Line 17, "we have that emissivity retrieved . . ." should be "we have found that emissivity retrieved . . ."

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.

Page 7, Line 10, "is derived form the University..." should be "is derived from the University..."

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.

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.

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.

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

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..."

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"