Response to Reviewer 2

I read the cited paper, Ait Hssaine et al. AFM 2018b, which is quite similar to this paper. I don't think it is necessary to republished the work on HESS again.

We emphasize that our previous paper published in AFM 2018 was a feasibility study of the TSEB-SM algorithm using field measurements. In this article, we tested the same algorithm in real life using readily available satellite thermal and microwave data. Such an application is fully original and raises new research questions clearly not addressed elsewhere. To our knowledge, there is still no evapotranspiration model that has been coupled to remotely sensed soil moisture and land surface temperature at such high (1 km) resolution. This is now possible using the formalism of TSEB-SM (Ait Hssaine et al. 2018) and the high-resolution soil moisture data sets derived from the disaggregation of SMOS-like data (Molero et al. 2016, Peng et al. 2017). To clarify this point, the following sentence was inserted as soon as the abstract of the revised: "The objective of this paper, after having TSEB-SM recently tested using in-situ measurements, is to evaluate the performance of TSEB-SM in real-life by using 1 km resolution MODIS (Moderate resolution imaging spectroradiometer) for LST and f_c data and 1 km resolution SM data disaggregated from SMOS (Soil Moisture and Ocean Salinity) observations by DisPATCh".

Another thing is that TSEB-SM model parameters must be calibrated with ground measurement when they are used to a new region.

We totally disagree with the Reviewer. The main feature of the TSEB-SM approach actually is to calibrate two fundamental parameters (controlling the soil evaporation and the plant transpiration separately) from soil moisture, land surface temperature and vegetation cover fraction data. In this study, all the data used for calibration are derived from remote sensing. Therefore, we do not rely on any in situ measurement, as notably stated by the title.

To address this concern, we clarified as soon as the abstract and introduction, the remote sensing-based nature of the TSEB-SM approach.

In the previous manuscript (P4: L13-L14): "The objective of this study is to investigate how satellite data can be used to retrieve the main parameters (a_{rss}, b_{rss} and α_{PT}) of TSEB-SM model." Was replaced (in the new manuscript, P4: L13-L15) by: "TSEB-SM has the cutting edge capability to calibrate its main parameters from readily available remote sensing data. The objective of this paper is to demonstrate for the first time this capacity using disaggregated SMOS and MODIS data".

Both papers do not show how to get ET result at regional scale.

It is true that the paper Ait Hssaine et al. (2018) does not test the TSEB-SM approach using remote sensing data. This is precisely why the present study is essential to demonstrate the capacity of the model to provide ET results at regional scale. Below, we present an example of a map of evapotranspiration in our area of study 'El Haouz' derived from the same model TSEB-SM

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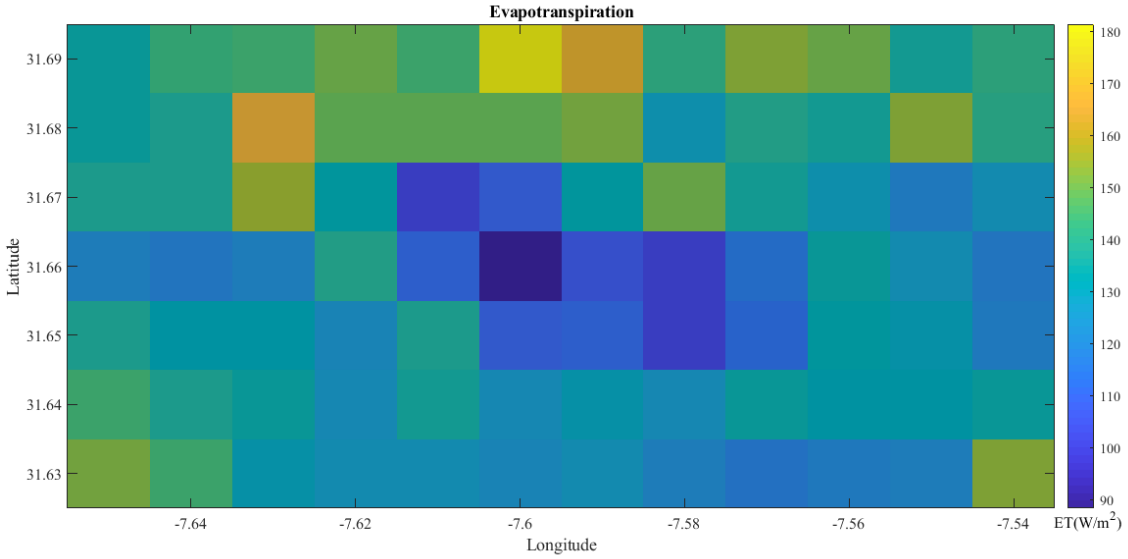

Figure 1. Map of Evapotranspiration using MODIS LST and DisPATCh SM .

The spatial application of ET will not be introduced in the manuscript. Since, this approach will be used in another ongoing study with finer resolution, compatible with the land use of the agricultural zone around Marrakech.

Both the abstract has emphasized on calibration of the model parameters. Furthermore, the calibrated parameters are not a fixed value, it varies with time. If the parameters are not fixed value. The model will always need ET or flux measurement to calibrate the parameter. I do not suggest to accept this work for a publication on HESS.

It is true that α_{PT} varies in time. However, this parameter is estimated from remote sensing data. The flux measurements are needed only for the validation of the TSEB-SM simulated sensible and latent heat fluxes. To clarify this point, the following sentences are inserted as soon as the introduction (P4: L6-L7): "It should be noted that only LST and SM are used for the calibration of yearly a_{rss} and b_{rss} as well as daily α_{PT}, while the flux measurements are needed only for the validation of the TSEB-SM simulated sensible and latent heat fluxes."

We hope that the above changes have clarified the self-calibrated TSEB-SM approach and its implementation using readily available remote sensing data.