This manuscript presents a detailed evaluation of the consistency of several observation-based datasets and how they characterize land-atmosphere coupling over Europe. It is a scientifically relevant study that incorporates multiple datasets and is well presented and well organized. I have only two general comments regarding the Abstract and Introduction, along with a few minor typo corrections.

The final part of the abstract is rather generic. For example these two sentences "Results show that the temporal variation of the state variables and the spatial variability of land–atmosphere coupling are mostly consistent across the different datasets. On the other hand, relevant differences in absolute values and seasonal variations can be identified." A bit more detail on which variables/datasets/regions show larger differences would be useful at the level of the abstract. From the results I found 3 key points: (i) EVT is the variable with larger inconsistencies between datasets (ii) PET has a strong dependence on the method selected and (iii) JRA55 land and atmospheric coupling differ from the other datasets. I'm sure the authors can do a better job in resuming the key conclusions, and I would suggest including it in abstract.

Reply: Thank you for your suggestion, we have added key findings in the abstract.

Results show that while there are relevant differences across datasets in their absolute values and seasonal variations, the inter-annual variation of the state variables and the spatial variability of land-atmosphere coupling are mostly consistent across the different datasets. The surface soil moisture is the most consistent among all the datasets having significant correlations, while evapotranspiration shows large inconsistency among datasets for Western-Central Europe and the Mediterranean. Some reanalysis datasets exhibit unrealistic annual cycle patterns across variables and regions, which is also reflected in their coupling representation in both temporal and spatial structures. (line 20-27)

We prefer not to name individual datasets for being 'good' or 'bad' in the abstract, but the specific information on more or less consistent datasets can of course be found in the results.

The introduction is very well organized, providing a clear background and motivation for this study. However, there is no clear mention to the role of vegetation status and its response to soil moisture and atmospheric conditions. I encourage the authors to expand a bit on the role of vegetation as mediator between soil moisture and evaporation for completeness of the introduction, even if this is not much explored in the study.

Reply: Thank you for this suggestion, we have added a few lines on the role of vegetation in the introduction section.

Finally, vegetation acts as a critical dynamic mediator in land-atmosphere coupling processes. By modulating stomatal conductance in response to fluctuating soil water availability and shifting atmospheric demand, vegetation strongly regulates the feedback loop between soil moisture and evapotranspiration (Denissen et al., 2022). Consequently, transpiration rates vary sharply across climates, remaining markedly higher in energy-limited regions compared to water-stressed arid and semi-arid ecosystems (Li et al., 2022a, 2021). This physiological regulation introduces a distinct nonlinearity into the relationship between soil moisture and surface evaporation (Williams and Torn, 2015; Schlesinger and Jasechko, 2014). Furthermore, structural canopy characteristics, such as vegetation type and the leaf area index (LAI), exert a profound control on both plant transpiration and direct soil evaporation (Baldocchi and Meyers, 1998). While a higher LAI generally expands the total transpirational surface area, densely closed canopies simultaneously suppress direct soil evaporation by intercepting solar radiation, and can concurrently moderate transpiration through internal canopy self-shading. (line 67-79)

167: “vegatation” : “vegetation”

Reply: Thank you, we have corrected the typo.

253: “by the factor of 2” : “by a factor of 2”

Reply: Thank you for pointing this out, we have corrected it in the manuscript

245/246: “..with drier decreases during winter and..” this sentence is not clear

Reply: Thank you for pointing this out. We have modified the sentence to a meaningful one.

264/265: “The PET annual cycle variation during summer for both GLEAM versions about 2 factors less..” : revise sentence syntax

Reply: Thank you for pointing out wording issues in this sentence. We have modified the sentence to a meaningful one.

273: “with soil moisture variability being highest” in this sentence context, is it “variability” or “mean” ? variability should refer to inter-seasonal or inter-annual variability, while here the mean annual cycle is discussed.

Reply: Thank you for pointing this out. We have reworded the sentence to clarify its meaning.

321: “the the”

Reply: Thank you for pointing out the typo, we have corrected removed one of the “the”

336: “All the datasets well captures the well known” revise sentence

Reply: Thank you for suggesting. We have reworded the sentence to clarify its meaning. “All the datasets capture the well known extremely hot and dry summer of 2010 over EEU, that was subject of several previous studies (Barriopedro et al., 2011; Lhotka and Kysel`y, 2015; Lebedeva et al., 2016).”

343: “WCE and MED show relatively smaller interannual variability for all the variables” This is a qualitative statement based on visual inspection of the plots ? Considering that the y-axis are different for each region, this could be misleading. Either remove this sentence, or compute the actual inter-annual variability (e.g. standard deviation of the time series)

Reply: Thank you for your suggestion, we have removed the sentence from the manuscript

353-354 "which reflects in the correlation matrix" : which is reflected in the correlation matrix

Reply: Thank you for your suggestion, we have corrected the sentence in the manuscript

451-452 "where the pattern is being reversed" : “where the pattern is reversed”

Reply: Thank you for your suggestion, we have corrected the sentence

454-455 "the increase in temperature is leading" : “the increase in temperature leads”

Reply: Thank you for pointing this out, we have corrected the sentence