REVIEW of « Water vapour fluxes at a Mediterranean coastal site during the summer of 2021: observations, comparison with atmospheric reanalysis, and implications for extreme events. »

This study describes the atmospheric measurements during the campaign MESSA-DIN during summer 2021, in particular comparing different observational data to ERA5 reanalysis estimates. The study investigates the differences between the two types of data, in the setting of previous literature assessing ERA5 performance. However, the manuscript lacks in preciseness and often omits the link between the data and scientific assertions. I am willing to recommend publication of this work only after the language and scientific statements are reviewed across the whole text. The latter should fit with the contents of the study.

GENERAL COMMENTS
- In the « Instruments and datasets » section please remove focus on the technicalities in favour of explaining more clearly how the measurements are to be interpreted, referring to the specific plots (e.g., how you infer presence of cloud cover).
- What do you mean by water vapour fluxes ? Are you talking about atmospheric transport or of fluxes from the surface to the atmosphere ? Please clarify in the whole text, as this is one of the main points you touch in the Introduction and Conclusions.
- In the conclusions you should acknowledge more clearly that the comparison with reanalysis is hindered by its coarse resolution compared to station measurements. In general, you also say that this highlights the need of better representations of coastal / orographic atmospheric processes (e.g. line 416). However, this is possible only with altogether different high-resolution models. We cannot expect a ~31 km resolution model to contain the topographic details that allow an improved comparison with your data.

TECHNICAL COMMENTS
The technical comments touch the problems of language and precision, which should be addressed more generally than in the individual comments, as indicated in the introductory paragraph of the review.

Line 35 : feeding the zonal or meridional air mass transport with what ? Representing a significant source of what ?
Line 37 : Are you saying that both remote water vapour sources and local moisture uptakes from intense evaporation are necessary for severe precipitation ? This is not clear in the sentence.
Line 41 : substitute « while » with « and »
Line 46 : remove « among the last decades »
Line 50 : remove « and recent studies » if you are not including additional references.
Line 52 : I suggest to reformulate with « around or higher than the climatological values ».
Line 55 : Expand acronym CIAO.
Line 57 : « at a coastal site the effect of... ».
Line 64 : « collected with a microwave radiometer and an infrared thermometer over 24h/7days from June 24 to September 30 2021. »
Line 65 : « In the time series, high values of relative humidity in the mid-troposphere were investigated… ». Note also repetition of term « contribution ».
Line 68 : What do you mean by « local paucity of warm and cold cloud layers » ?
Line 73 : « provides » to replace « offers ».
Line 75 : « the investigation of the rôle of aerosols... »
Line 88 : remove « presented in this paper ».
Line 102 : expand acronym SNR.
Line 175 : I do not agree with the sentence « A decrease in the RH values in the mid-troposphere

often corresponded to an increase in the values within the boundary layer. ». In my opinion there is no clear pattern between RH in the mid troposphere and in the boundary layer, as BL-maxima seem to occur both with mid-tropospheric minima and maxima.

Line 177 : What levels are you talking about ?

Line 195-197 : The sentence is badly structured. Please correct.

Line 200 : replace « in this light » with « Limitations of this kind ».

Line 202 : Add reference to figure in the first sentence in paragraph.

Line 210-210 : Convection is linked to the presence of strong CAPE, but also depends on low values of convective inhibition (CIN) or on the presence of forcing overcoming CIN. For this reason you cannot directly relate CAPE and convection. In these sentences, you should moderate the strength of your assertions.

Lines 215-217 : Insert ref to figure.

Line 252-253 : I don't understand what you mean by « improved fit for temperature, wind and humidity in the troposphere in comparison with radiosonde data prior to assimilation ». Are you comparing the IFS performance with radiosonde data before and after data assimilation ? Please clarify.

Line 255-256 : please rephrase to « in the upper troposphere ERA5 is found to underestimate water vapour concentration and ice supersaturation ».

Line 259 : « addressed » to replace « applied ».

Line 266 : the reference to the flood event is out of place here. If possible, remove mention of the Cy47r3 release. Or else clarify differences with respect to other versions in a separate sentence.

Line 271 : remove « comparator ».

Line 272 : separate the two sentences. Note that the second is not in opposition with the first, as the term « though » would suggest.

Line 279 : « even in a different environment than … NAME FIRST ENVIRONMENT »

Line 293 : « MP3014, WHICH is compared in … ».

Line 297 : Merge with previous paragraph. Also, in this and in the following paragraph, add ref to Figure 9.

Line 315 : Not clear what you mean by « is the intensity of the IVT vector with the components ».

Line 217 : if v is vector denote with vector symbol (arrow or bold).

Line 320 : note that decade means ten years. Please correct.

Line 319-321 : The sentence from « involving » to « Africa coast » is confused. Please separate from previous sentence and rephrase to make it comprehensible.

Line 323 : Please add label on plot corresponding to the position of Soverato.

Line 234 : « transport ».

Line 235 : refer to Figure 13.

Line 334 : « contributing ».

Line 334-338 : replace « ; » with full stops. Also, please rephrase and create logical connections between the sentences. At the moment it is difficult to follow.

Line 341-344 : Only the first part of the sentence is relevant for this study. Please remove misleading reference to climate integrations.

Line 371-373 : Rephrase and separate sentence starting from « only because ».

Line 375 : replace « spreader » with « wider ».

Line 375-376 : sentence is not clear.

Line 376-380 : The whole period is confused, and it is not clear on which data/analysis you base your statement. Please improve clarity and precision.

Line 385 : Since you have no direct measurement of the water-vapour greenhouse effect impact on temperature, you can cite this as a potentially amplifying factor.

Line 408-410 : You should be more specific about the number of case studies. I believe you analyse water vapour transport rather than fluxes from the sea. Say « Two intense water vapour **transport** events were identified using the ERA5 data, one from the northwest Mediterranean (Spanish/French gulfs or Tyrrhenian Sea) and one from North Africa ».

Line 416 : « compared to ground instruments detecting less frequent cloud cover. This emphasizes the need for improving reanalysis performance in complex coastal and orographic settings. »

Line 428-433 : The whole period is impossible to follow. Please rephrase and separate in multiple sentences to make it clear.

Line 440 : « affecting Central and Eastern Europe » Can you say this based on climatological studies ? If not, please specify you are talking of one example and do not generalise.

Line 451-452 : The last sentence is badly structured. Please revise.