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## Reply on CC1

Nahid Atashi et al.

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Author comment on "Delineation of dew formation zones in Iran using long-term model simulations and cluster analysis" by Nahid Atashi et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-54-AC1>, 2021

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***The manuscript entitled "Delineation of Dew Formation Zones in Iran Using Long-Term Model Simulations and Cluster Analysis" presents valuable results about the dew potential in Iran during a long-term period (40 Years) that can be utilized for strategic planning to harvest due water as an alternate source of water that can be used for agricultural purposes. In general, the manuscript is well written, well structured, and technically sound. I recommend for publication in the Print-Form in Hydrology and Earth System Sciences after minor revisions.***

Response: We thank the reviewer for their constructive comments on our submitted manuscript. We have copied the comments of reviewer here in red and include our response to each individual comment after "Response"

### Specific Comments:

- ***The model input consists of an extensive meteorological data-base that is transformed and processed to be usable according to the model setup. However, equation 1, which is related to the scaling of the wind speed from 10 meters to 2 meters, has limitation that need to be addressed in brief.***

Response: This is true. In the model input description (lines 97-99 of our submitted manuscript) we stated the limitations of this equation in brief. In the revised version we will add references which discuss the limitations of this equation.

- ***The cluster analysis is a powerful tool to identify the principal groups in the model results. The authors used this method in a brilliant way to identify the dew formation zones and match them with the climate zones in Iran. The authors used Ward's minimum variance method (Ward, 1963) to determine the number of groups (clusters) to define the dew formation zones as shown in Figure 5 and led to six zones. Why six zones were the optimal number? Is it possible to reduce the number of zones?***

Response: We have already mentioned the reason of choosing 6 clusters in Lines 179 - 187 in our manuscript. Indeed, we investigated also 3 and 4 clusters in detail but they failed to capture the different climate and dew zones due to high variance within the groups. In the revised manuscript we will add some brief comments about this additional analysis.

- ***As a semi-arid climate in the majority of Iran, it is valuable to make a brief comparison between the total amount harvestable dew water and compare it with the total amount of rainfall over Iran. Here, the comparison should not be for the total amount but rather to compare with rainfall depth. The comparison is vital to show that the harvestable dew yield is close to the rainfall depth in some regions.***

Response: We considered this aspect in our previous publication (<https://doi.org/10.3390/w11122463> - specifically see Figure 4) investigating 7 different stations in Iran in different climate zones and did a comparison between the total amount of harvestable dew water with rainfall in detail. In the revised manuscript we will refer to this previous study. In brief, in the arid coastal areas in the southern of Iran and in central desert areas, dew formation could be about 25% of rainfall which is significant.

- ***From the model simulation it looks clear that the regions that received due potential are actually the same ones received the heights rainfall during the year and among Iran. How can this redistribution of the harvestable dew water can enhance to replace the scarcity of water in other regions in Iran such the central and eastern parts that receive the lowest amounts of rainfall and the least potential for dew formation? This is only from a strategic point view to utilize the importance of this study.***

Response: This is true. The areas with high dew potential are the same areas with high precipitation. However, as we also mentioned in lines 359-360, the frequency of dew days is about 3 times of the rainy days. This is also true within arid areas in the central and eastern parts of country.

- ***It is known that Iran is not the only semi-arid country in the region. How the authors can elaborate the results to be utilized in other similar countries like middle east countries and Afghanistan, Iraq, Syria, Jordan and Gulf countries.***

Response: In practice, the model can be applied to any climate as previously described and applied by Vuollekoski et al. 2015. What is needed is the meteorological data set (ERA-Interim), which is readily available for the whole globe, and the model can be applied anywhere in the world including other arid and semi-arid areas even if they lack observations.

***After all, this kind of modelling studies is needed and recommended in the region. This study has revealed valuable information and understanding about the potential of dew harvesting in such semi-arid regions.***

Response: Thank you for pointing out the importance of this study and modelling tool.

