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Comment on nhess-2022-41

Anonymous Referee #2

Referee comment on "Human influence on growing-period frosts like the early April 2021 in Central France" by Robert Vautard et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2022-41-RC2>, 2022

The authors analyze the human influence on the harsh frost weather in early April 2021 after a unusually warm March over central France, which pose great damages on the grapevine and fruit trees. The results show that human-induced climate change has significant impacts on such extreme events. The topic is interesting and the workload is also relatively heavy. However, I think there is a framing issue and some methodological issues, which may pose a question about the coherency and credibility of the study.

At first sight, I think it is a attribution study according to the title. But when I read the whole paper, I feel like it is a evaluation and projection study. Thus, I think the authors should first clarify the main purpose and storyline. In terms of the framing, it is usual to first describe data and methods used in one paper, and then elaborate the results. The results can be organized as observation, model evaluation and attribution. In this paper, the data and methods are combined with the results, which add difficulties to reading and understanding. This study used five model ensembles with different resolutions, and the future scenarios include RCP8.5 and SSP2-4.5. But what is the purpose to use all of them ?

The paper involves too many unclear and inaccurate descriptions as well as the inappropriate choices of the methods. The following is a list of some specific comments:

(1) In terms of model evaluation, the Kolmogorov–Smirnov nonparametric test is often applied to determine whether two probability distributions are well-distinguished. In addition, the observed and simulated time series can also illustrate whether the models have the ability in reproducing the observation.

(2) There are too many data tables. It is more visual to draw figures like boxplot or bars.

(3) Section 4.5 is not necessary in this paper, and the results derived from two ensembles with different scenarios are not comparable. The author can do more literature research and write another projection paper.

(4) The paper only focus on the trend of regional mean, and it is insufficient to know the pattern distributions.