EGUsphere, referee comment RC2
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Comment on egusphere-2022-48

Anonymous Referee #2

Referee comment on "Investigation of the extreme wet–cold compound events changes between 2025–2049 and 1980–2004 using regional simulations in Greece" by Iason Markantonis et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-48-RC2, 2022

This paper focuses on the wet-cold compound events under climate change in Greece using a series of stations observation, reanalysis, and the historical and projection from the EURO-CORDEX. The research topic may be a relevant to the society, however, due to the poor writing and some infidelity in the data used for validation, I feel a major revision is needed, after a great and careful addressing of the following comments:

Major comments

- The writing of the whole paper is in a poor state, including some error in words, and vague expression including the title. The title is not good since it only uses a vague naming that covers the scope of the study, but failed with specific details, including the experiments, date time, etc. Such as, the reference seems to be investigating projection of compound events future projection, rather than climate change which may mean present and the future. Some topics like "Investigation of the future extreme wet-cold compound events using EURO-CORDEX regional simulations from 2025-2049."
- The picture used is in low quality. It is hard to see virtually every taylor diagrams (Figs. 19-25) in the manuscript. Other than that, most of the figures are vague to see, poor in quality, which may need reproduction.
- Question the fidelity of using the reanalysis data since Greece is a mountainous region and the authors' conclusions seems to be largely associated with events on the mountains. There is potential of large cooling temperature and excess rainfall bias in the reanalysis data despite of the , the authors may find supplementary data from archives such as the Global summary of the day or month (https://www.ncei.noaa.gov/access/metadata/landing-page/bin/iso?id=gov.noaa.ncdc:C00516) for supplements to that of the reanalysis data for further evaluation, that would gain more fidelity of the study.
- Creativity issue. The current study fails to go one step forward towards higher creativity. It is obvious that the study of the compound events is not uncommon, whatever the means. The authors haven't significantly separated themselves with these studies other than stating the regional uniqueness for this certain compound event

examination. However, we need to note that creativity is insufficient just to use similar method and switching to another region. It may be better if the authors can separate themselves with that of the similar studies of other regions to counter this issue. One possibility is stating the uniqueness of the Greece mountainous regions, and how this trait affects the extreme compound event.

- What is the take-away message? The author may consider elaborating this part of the work, and how the conclusions drawn from the analysis may be applicable or vary to other mountainous regions around the world, such as that of the Tibetan Plateau, Rocky Mountains, the Andes, and the Alps. This may bring a more valuable message to the broader scientific community.

Minor comments

Line 1, the abstract lacks introduction with the compound events and how it is important to understand. One sentence at least should be used to state the importance.

Line 35, “how the occurrence of these events will be affected by climate change. using projection data from and .”, there seems to be a dead sentence just here.

Line 57, “thence” -> “hence”