**Response to reviewer #2**

The authors study the effects of land-coast interactions and orography over a complex study area on extreme precipitation. The work reveals how short (radar) time series could be used to look at several features of a study area in depth. They use the return levels themselves as well as the underlying parameters to study these effects over different durations ranging between 10-minutes and 1-day.
This is a high-quality manuscript, that is well-structured, well-written, and contains a lot of detailed information while still conveying the main message. Therefore, this review only consists of some minor points and clarifications:

We would like to thank the reviewer for the time taken to read our manuscript and for the constructive comments. We are sure they will help us better delivering our results in our revised manuscript.

We would also like to point out here that, following an improvement in the codes, some of the figures will be slightly updated in the revised version of the manuscript. These changes are minimal and do not affect the results nor the conclusions of the study.

1. Figure 1: The lines with the annual rainfall amounts are hard to distinguish from the underlying elevation in the mountainous areas. Perhaps the authors could change the colors, or add an extra panel containing the annual rainfall amounts. Also add some more information on the transects, as it only becomes clear much later on why these transects are included.

Thank you for the suggestion. We will update the figure to address the request and we will edit the caption to better specify the meaning of the transects: *"…location of the three transects shown in Fig. 6 and Fig. 7"*.

2. L147-151: It would be helpful for the readers if the authors add some information on which ranges of the FSE are considered good, and how much this "large improvement over the previous radar archive available for the region" is.

It is rather subjective to quantify what is "good" in terms of these metrics, especially for the FSE. What we can do is to include a quantification of these quantities together with a direct comparison with the previous radar archive for the area. We will update section 2.3 to include this information: *"These metrics imply that the root mean square error of the daily amounts is 107% of the average rain gauge daily amount in wet days (≥0.1 mm), and that ~42% of the variance is to be imputable to measurement errors. These results represent a large improvement over the previous radar archive available for the region, which had correlation coefficient below 0.5 and FSE between 1.5 and 2 (Marra and Morin, 2015, personal communication). These improvements are attributable…"*. It should be noted that the metrics in Marra & Morin 2015 were presented for hourly and yearly scale, while here the daily scale is reported (hence the "personal communication").

3. L151-L159: what are the implications of the issues of the radar that still remain? Which issues generally cause over or underestimation, or in which regions are the results likely over/underestimated?

We will improve this paragraph to provide some additional details: *"Despite the evaluation metrics, some issues still remain in the final estimates, which could decrease the quantitative accuracy of the estimated return levels: […] Underestimation due to range effects is also visible in the northern and southern portions of the domain for areas farther than ~100 km from the radar"*.

4. Section 3.1 point 1 (L181-L188): what are these 2 weather types? Are they two of the ones introduced in the study area? Why do they need to be separated by 1-day dry periods?

We will improve the clarity of this aspect: *"Storms are defined at the regional scale as consecutive wet periods of the same weather type separated by 1-day dry periods or by the change to a different weather type. […] Weather types are defined according to the classification presented in Marra et al. (2021a), which*

*is a simplification of the semi-objective classification by Alpert et al. (2004) and classifies wet days into two types: (i) Mediterranean cyclones, (ii) other types (mostly active Red Sea troughs, see Sec. 2.1).”*. As stated in the manuscript, separating or not separating them will not affect the results of this study and, strictly speaking, they don't need to be separated for the analyses developed in this study; however, in order to have compatibility with future planned studies in which the separation is necessary, we keep this separation alive also in this study: *“It is worth noting that, although the framework allows to separately consider different weather types, the use of a unique weather type is not crucial for the accurate estimation of return levels in the study area (see Marra et al. 2019); separate consideration of the 2 weather types is here included to grant compatibility with future studies involving climate projections, for which the distinct use of weather types is crucial (e.g., Marra et al., 2021a).”*

5. Section 3.3: Make the part of using GEV for comparison more prominent, and provide the abbreviation in this section already. The abbreviation a few lines further now comes without an introduction.

Thank you for pointing this out. We will introduce the acronym at the end of section 3.3, where the method is presented, and provide a better explanation of the underlying methodological details in-text rather than in parenthesis: *“Traditional methods are here constructed using the block-maxima approach: series of annual maximum values are extracted from the full rain gauge records; parameters of the fitting Generalized Extreme Value (GEV) distribution are estimated using the method of the L-moments (Hosking et al., 1990).”*. Overall, this method is well-known, and in the paper GEV is only used in Fig. 2a; we hope this modification will suffice our needs.

6. L258: change to: “only seven show FSE exceeding 50% of which two exceeding 75% (Fig. 2b; see Fig. S3 for more details on other durations)”.

Please note that, following an improvement in the codes we run, this figure will be slightly updated in the revised version of the manuscript. We will update the text to: *“…only nine show FSE exceeding 50%, of which three exceed 75%...”*

7. Figure 3: add ticks on the x-axes for 3e-h. Would it work for such density plots to have 1 colorbar representative of all sub-panels for easier comparison?

We will add the ticks to Fig 3 and also to Fig. 5 which shared the same visualization issue, thanks for pointing it out. Unfortunately having 1 colobar for all the panels would make them extremely difficult to read; it was our initial choice but we eventually realized that having multiple colorbars is better.

8. Section 4.4: why are these the longitudinal transects chosen over these 3 latitudes?
   Consider introducing this in the method section, possibly around Figure 1 where they are just mentioned in the caption.

We will improve the caption in Fig. 1 to provide additional information on the transects: *“…location of the three transects shown in Fig. 6 and Fig. 7…”*. We will also provide details about the choice of these specific transects, but we feel it would be more appropriate to do so in section 4.4: *“The location of these transects is chosen based on radar visibility and on the presence of regular orographic profiles.”*

9. Figures 6 and 7 are normalized, which does provide interesting information and helps the reader in understanding the differences along transects or orography. However, it would be interesting to also include some actual values, for instance of the T2 and T100 estimates, also over different durations.

Thank you for the suggestion, we will provide a figure analogous to Fig. 6 (only scale parameter) and Fig. 7 without normalization in the supporting information as Fig. S4.

10. L372: Do you mean middle transect instead of northern?

Indeed, thank you for pointing this out, we will update the text accordingly.

11. L372-L373: The patterns of the rift valley described aren't visible in 3f, consider adding: "for the northern two transects".

We will remove this sentence from the paper.

12. Figure 9: Consider changing using a circular colormap as this one is hard to interpret.

Thanks for the suggestion, we will update the colormap as recommended.