

Comment on hess-2021-395

Anonymous Referee #2

Referee comment on "Coastal and orographic effects on extreme precipitation revealed by weather radar observations" by Francesco Marra et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-395-RC2>, 2021

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:

- 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.
- 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.
- 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?
- 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?
- 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.
- 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)".
- 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?

- 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.
- 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.
- L372: Do you mean middle transect instead of northern?
- L372-L373: The patterns of the rift valley described aren't visible in 3f, consider adding: "for the northern two transects".
- Figure 9: Consider changing using a circular colormap as this one is hard to interpret.