1. Soil erosion is a rather complex problem involving many spatially and temporally varying aspects of the rainfall (drop size distribution and intensity) and associated wind(horizontal and vertical), water at the surface (both standing and flowing), vegetation cover, and the soil characteristics. Since the title mentions "rain erosivity", it would be useful to at least point out this complexity in the introduction and referring to papers by Brian (2000), Kinnell (2005), and Iserloh et al. (2013), and references therein. Moreover, significant erosion and landscape changes are often the result of catastrophic events (e.g., impacts of a tropical cyclone).

Reply: We agree with the reviewer that the soil erosion is a rather complex problem. It depends on several factors although rain (including high impact weather systems like cyclones) is the most important among others. As per reviewers' suggestion, the above information with relevant references has been included in the revised manuscript.

Furthermore, the title of the manuscript has also been changed to better reflect the material presented in the revised version of the manuscript. As per one of the reviewers' suggestion, the title has been modified to "One year analysis of rain in a tropical volcanic island from UHF wind profiler measurements".

Please note that T. Narayana Rao and O. Bousquet , who actively participated in the revision of the paper, have also been added as co-authors.

2. How typical is the year of rainfall discussed compared to long-term records? Also, howtypical are the three presented case? Some elaboration on that may help getting a broader perspective of how representative the results are.

Reply: The weather systems that produce rainfall in the studied region are described in the revised version. There are four types of weather systems: cold front and strong trade winds, which are dominant during winter, as well as low pressure systems/depressions and north-northeast systems, which usually develop in summertime. As per reviewers' suggestion, the occurrence statistics of these weather patterns during the study period with respect to the climatology is now discussed in the manuscript. We have also added a detailed analysis (i.e., retrieving DSD, estimating kinetic energy, etc.) of a typical event for each of the four weather patterns.

3. Some further discussion of the data processing and quality control is needed. For example, what are the criteria used to remove suspicious data or not applying the raindrop spectral parameter retrieval? Looking at Figs. 8 –11 it appears as if the retrieval was applied not only to rainy echoes but also to profiler data that didn't contain any rainfall. Those values obtained for marginally or not raining echoes are not to be trusted.

Reply: The DSD retrieval algorithm was indeed applied to all data in the first version of the manuscript. This has been corrected in the revised version: following Rao et al. (2008) we now first identify rain echoes, using Doppler velocity and reflectivity criteria, and then retrieve DSD only for rain echoes. This procedure is detailed in the revised version together with relevant references.

4. This study lacks thorough error/uncertainty analyses. For example, the raindrop spectra parameter retrieval is sensitive to vertical winds encountered. Assuming a zero wind effect is likely not a valid assumption rendering the subsequent analyses highly suspicious. Some discussion of the impact of wind errors is needed for the reader to get a sense of how much to trust the shown results. Moreover, some of the techniques discussed in Section 1 "Introduction"enable simultaneous estimation of the ambient air motion and raindrop spectra(e.g., Williams 2002). Why were they not explored?

Reply: We agree with the reviewer that the vertical velocity is essential in retrieving DSD with wind profilers. The error in retrieving DSD increases with vertical velocity. Kirankumar et al. (2008) quantified that the error in rain rate could be as large as 50% for a vertical wind velocity of 1 m/s. This information is included in the revised version of the manuscript.

5) I was underwhelmed by the discussion of the presented figures. Please expand the digestion of the results and carve out meaningful take-home messages. For example, are the observed variability and differences in raindrop spectra parameters typical and how do they relate to the underlying rainfall processes, etc. Moreover, the figures need work to make them more legible (see details below).

Reply: We have tried to improve the manuscript by categorizing rainfall events based on different weather patterns. Four types were identified and one case study associated with each category was studied in details. Although we presented the variability of DSD for each of these weather patterns, understanding their variability in relation to the underlying rainfall processes is out of the scope of the present study. We do believe, however, that it is an important topic and will be taken-up in the near future. Nevertheless, we would like to mention that the present paper focuses more on DSD retrieval, description of their variability in different weather patterns and their impact on soil erosion.

Minor Concerns & Suggestions

6) The thesis by Robert (1986) seems to be a key reference in terms of the characterization of rainfall experienced on the island of La Réunion, but unfortunately that document is not widely accessible. Are there no other refereed papers available that could be cited instead (or in addition)?

Reply: Others documents are available:

Barcelo, A., et J. Coudray. 1996. « Nouvelle carte des isohyètes annuelles et des maxima pluviométriques sur le massif du Piton de la Fournaise (Ile de la Réunion) ». *Revue des sciences de l'eau* 9 (4) : 457. Doi :10.7202/705262ar.

Robert René. Pluviométrie à l'île de la Réunion : des travaux de J. Defos du Rau (1960) à nos jours. In: L'information géographique. Volume 65 n°1, 2001. Pp. 53-59.; doi : 10.3406/ingeo.2001.2734.

7)Page 3252, line 10: Replace "Gossard (1988, 1990)" with "Gossard (1988) and Gossard et al. (1990)".

Corrected thanks!

8)Page 3252, line 25: It would be good to make reference to Ulbrich (1983) regarding the gamma function description of the raindrop size distribution.

Corrected.

9)It would be appropriate to cite one or more papers that have used rain gauges or disdrometer to calibrate profilers in Section 2.3 "Radar Calibration". The approach used by the authors is not novel in that regard. In addition, some discussion about sampling volume differences and the effect of

spatial and temporal variability of rainfall on the comparison of profiler and rain gauge data would be useful here.

Reply: This section has been modified as suggested by the reviewer. More references to studies making use of rain gauge or disdrometer for radar calibration are given and radar-rain gauge comparisons are now discussed in the revised version of the paper (including merits and limitations of such comparisons):

« Radar calibration is an essential step in deriving DSD. For power calibration, the radar backscatter at error-free lowest range gate is compared either with disdrometer-derived *Z*/*R* or rainfall rate obtained from a rain gauge. In the present study, the calibration is done by comparing rain rates obtained with profiler and rain gauge, separately for wet and dry seasons (Figure 3). Steiner and Smith (2000) pointed out that uncertainties from radar and raingauge measurements are related not only to the space–time resolution and coverage of the observations, measurement errors, but also to the weather i.e the variability of the raindrop size distribution. It is thus important to know the range of uncertainties involved in varied approaches to estimate rain rate. The resolution of the rain gauge measurement is a failover. It depends on the surface collection and the nominal mass failover the bucket for an area of 1000 cm ^{2} a mass of 20 g, it is 0.2 mm in height of water. The unit is set to minimize the error at low intensities of rainfall. With very high intensities (> 150 mm / h), the maximum error in *R* can reach -10% (the measure is always underestimated). It is corrected numerically by the recent acquisition systems.

Clark et al.(2005) observed that the primary cause of uncertainty in calibrating a profiler using a disdrometer/rain gauge is large reflectivity gradients in the lowest few hundred meters above the ground. Therefore, the height of the radar data is taken as low as possible considering signal saturation, receiver linearity, and ground clutter. The best level is found to be between 400m and 500m.

It can be seen from Figure 3 that *R* is larger during the wet-season than the dry-season In spite of the complications associated with radar-rain gauges comparisons mentioned above, the correlation between them is found to be >0.7 in both seasons, which is quite good. The spread of the scatter is mostly due to different wind regimes, which will be described in the following section. »

10)Page 3257, line 15: Looking at Fig. 4 I see rain rates approaching 30 mm/h, but not 40 mm/h. Maybe I am missing something?

This figure was removed in the revised version of the manuscript

11)Page 3258, lines 6 -7: "The high precipitation rates in June may be explained by the passage of fronts . . ." This sounds speculative, but I am sure that could be properly answered whether indeed it is the case. There are other places throughout the manuscript as well where less speculative (i.e., more definite) expressions would help sharpen the discussion.

Reply: The influence of the subtropical jet stream is maximum during winter on La Réunion Island (Clain et al., 2009), which is favorable to the passage of frontal perturbations.

12)Page 3258, line 23:

Reply: A few past studies have shown that the trade-wind inversion could indeed limit the growth (or development) of convective clouds (e.g., Riehl 1955, Augstein et al., 1973, Stevens et al. 2007). This information has been added in the revised version of the manuscript.

13)Page 3261, line 27: That paper by Smith (2003) doesn't address any raindrop spectra parameter relationship and thus is inappropriately cited here.

Reply: Reference to this paper has been removed.

14) The paper by Steiner and Smith (2000), and references therein, would be highly relevant to the discussion in Section 3.2.4 "Kinetic energy fluxes", especially with regard to relating radar reflectivity to the vertical kinetic energy flux of raindrops.

Reply: Thank you for pointing this out. The above paper is now referred and the results obtained in the present study are discussed in relation to Steiner and Smith (2000)'s paper.

15)It might be beneficial to have some native English speaking person edit the manuscript to smooth out stylistic language problems and typos(too many to be pointed out individually)

Reply: We did our best to remove the grammatical mistakes and typos in the revised manuscript.

16) Figure 1: Please explain all the symbols shown in this figure.

Reply: Thank you for this suggestion. The symbols are now explained in the revised version.

17)Figure 2: How was this rainfall map derived? What are the underlying data (e.g., satellite, radar, and/or rain gauges)?

Reply: Figure 2 was generated using rain gauge measurements. Rain gauge observations provide high resolution rainfall data (6 min.).

18) Figures 4 and 5: Please use the same color for indicating the UHF-based versus rain gauge rainfall rates. Also, the legend at the bottom of Fig. 4 is not readable(the same is true for the center panels in Fig. 10).

The above figures have been modified as suggested by the Reviewer.

19) Figure 6: A two-panel figure (one panel each for the dry and wet season) might be better. That way the mean and standard deviation can be shown directly (i.e., no need to plot a quantity "mean + standard deviation").What are the corresponding rain gauge values? It would be helpful to include these values as well.

The above figures have been modified according to the suggestions of the Reviewer.

20) Figure 7: It would be helpful to point out which of the islands is La Réunion.

Done thanks!

21) Figures 8 –11: These figures are way too small to be properly absorbed by a reader. Also, the choice of color scale should be improved; for example, the human eye gets drawn to the red color, but as far I can tell this is not were the key information in a panel is. Furthermore, the color scale saturates in many places (e.g., vertical particle velocity) where I was trying to see relevant structures.

Reply: The figures have been improved following the Reviewer suggestions.