

## ***Interactive comment on “High occurrence of new particle formation events at the Maïdo high altitude observatory (2150 m), Reunion Island (Indian Ocean)” by Brice Foucart et al.***

**Anonymous Referee #2**

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This paper provides an overview of NPF events observed at Maïdo on Reunion Island (2150 m).

This is a well written paper.

Minor comments:

Abstract: Line 21 – term “off-season” is unclear to this reader.

Line 306: The statement “similar seasonal trends were observed for nucleation frequency in 2014 and 2015”, is only observed from May – Dec.

Line 331: Change FNP to NPF

C1

Why did you choose to calculate the growth rate over such a small size range (12-19) and few bins?

Major Comments:

Does the elimination of 47 days that occurred during the three eruptive periods, along 61 days of missing data, have an impact on your results pertaining to seasonality of NPF. From Figure 5, it appears that a significant number of days in 2015 were not considered during the winter (Feb and March), and there was not overlap with 2014 data for confidence. My concern arises due to the statistics of small numbers considered. Often the months with lower NPF frequency (near or below the annual average) are represented by the months with a more complete dataset (30-31 days). Would you provide more information or statistics showing that you are representing each season with a similar amount of data?

This is especially relevant since you are contrasting your results with those reported by Rose et al. (2015), and do not see NPF governed by dry/wet seasons. The paper continues with potential explanation for these differences.

This becomes more evident in Section 4.4. The meteorological variables are discussed in reference to the monthly NPF frequency, monthly averaged GR and monthly averaged formation rates. I would encourage the authors to instead consider robust statistical methods to look for significance (or lack thereof) between these meteorological variables (along with CO) and NPF frequency, GR or formation rates. For example, do you see correlation on the daily level between NPF frequency and threshold values of gas concentration or state variables? This section is inconclusive.

Section 4.5 is very interesting, and as the authors note in contrast to previous studies, as low CS is normally associated with NPF or at least you do not expect an anti-correlation. This brings us to the conclusion that you have a precursor potentially emitted simultaneous to aerosols that are increasing CS. This is consistent with your Figure 4 (and previous reviewer's comments pertaining to advection).

C2

Why was Figure 4 selected as the example plot? Does the appearance of accumulation mode particles simultaneous to the formation of new particles always happen? This was mentioned in reference to this case, but it is not clear if this happens frequently (during every season) at the site. If so, is this source of accumulation mode particles associated with a specific wind direction? This is stated in the conclusion, but this reader would appreciate more information pertaining to the details of this source.

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