The study published by Aliaga et al. concerns the development of a method for automatically providing information on the formation of new particles from observations, both in terms of the occurrence of the process and its intensity. Although its effectiveness is only demonstrated for the boreal forest environment in this study, this method appears to be an interesting alternative/complement to traditional methods that rely on visual detection of events (and are therefore subject to a certain subjectivity); in particular, it overcomes the limitations/difficulties associated with these methods with regard to the identification and characterization of very low-intensity events. I therefore recommend the publication of this work, which I hope will subsequently call for further studies to assess how this approach can be used in environments with contrasting characteristics. The few questions and comments listed below should, however, be considered before publication of this manuscript.

P2, L53-55 : « *However, the indicators developed __so far__ tend to be sensitive to the dominant NPF pathway and possibly other site-specific factors, casting doubts about their general applicability to different atmospheric environments* » : I find this wording somewhat disturbing, as it implies that, unlike existing methods, the proposed method is not site-specific... but this is the case, at least as far as the determination of active and background regions is concerned (as clearly mentioned in Sect. 3). Furthermore, there is nothing in this study to demonstrate the applicability of this method (which limitations are actually discussed at the end of Sect. 3) to other environments (e.g. mountain sites affected by complex boundary layer dynamics; urban areas affected by pollution, with background regions possibly changing on a weekend / week day basis).

P2, L63-64 : About the plan. Since the description of the method is based on the data, I would suggest putting the description of the site and the instrumental set-up before the description of the method. Furthermore, I think Sect. 3 could be split into two sub-sections to improve the clarity of the messages: one associated with the results in the boreal forest, the other dedicated to the limitations of the method / discussion of its use in other environments.

P2, L68 : About the method in general. For me, a few lines clearly explaining how the method can/should be used are missing. I understand that the information associated with ranking and the determination of the modes first requires a sufficiently long data set, and that the "reference image" resulting from this analysis can then be used to "characterize" new data/individual events, to position them. Is this correct? If so, what are the constraints for defining the reference dataset (length, representativeness of different seasons, etc.)?

P5, L146-148: "*The CPCs can detect particle number concentrations ranging from 3 nm to 10 nm, whereas the detection of particle size range for the DMPS is 3–1000 nm.*" The wording does not seem clear to me. I think it should be clear what the cutoff diameter associated with each of the two CPCs is, and then the size range covered by the setup that combines the two CPCs / DMAs.

P5 : About the coagulation sink.

- L167-168 : "*The second term describes the particle losses due to coagulation to larger size particles __with__ corresponds to their number concentrations (NDp).*" Check the wording.
- Equation 3 : I do not understand the proposed formulation if Dp1 and Dp2 have fixed values; in other words, what does the sum relate to?
- L172: "*The correction factor for particle hygroscopic growth is applied when calculating coagulation sinks.*" Can the authors say a little more about this correction factor, or at least cite the study describing its calculation?

P6, L183: "*we examine the comparison of ΔN2.5-5 and diurnal patterns*". The variables concerned by the diurnal variations studied should be indicated.

P6, L204 – 206 : "*In addition, Fig. 6 demonstrates that the novel Nano Ranking Analysis presented here can be compared with continuous variables, such as the particle formation rate, in investigating NPF.*" Could the authors elaborate a little more on how the comparison is carried out? How is the value of J included in the comparison obtained: is it a value (mean, median?) calculated over the whole day, over an identified time window?

<u>Minor / technical comments</u>

P1, L 34 : *Kulmala et al., 2022b* : This paper should be referenced as Kulmala et al. 2022**a** since there are no other references by Kulmala et al. published in 2022 mentioned before.