

Interactive comment on “Climatology of new particle formation events in the subtropical North Atlantic free troposphere at Izaña GAW observatory” by M. I. García et al.

Anonymous Referee #2

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1 General comments

The paper "Climatology of new particle formation events in the subtropical North Atlantic free troposphere at Izaña GAW observatory" by Garcia et al. deals with the classical site-approach of the atmospheric new particle formation (NPF).

The work presented in the paper is based on a 4 years data set from june 2008 to june 2012 at the high altitude site of Izaña, Tenerife island.

Authors analyze observed NPF events in term of frequency, formation, and growth rates but also in term of dependence to many atmospheric parameters, reactive

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gases and dusts measurements. They also provide a comparison to the existing data obtained from other altitude or boundary layer site. 463 event days on a total of 1178 available days have been identified and analyzed.

In my opinion, this analysis provides interesting data that might help aerosol community to understand in which conditions NPF events appears, especially at high altitude location. Thus the present work is suitable to be published in ACP after few minor revisions.

2 Specific comments

- Authors should also mention in the introduction the work of Metzger et al. (2010) on organic & sulfuric acid nucleation experiments.
- Since SO₂ data are available, authors could use the statistical proxy from Mikkonen et al. (2011) to estimate the sulfuric acid concentration. Therefore, they could conduct a deeper analysis on the conditions that promote the detection of NPF whether or not sulfuric acid is enough to explain the observed growth assuming a kinetic regime or if another condensable vapor is needed to explain what is observed. This analysis would be interesting in the frame of the one published by Kuang et al. (2012).
- If I remember correctly, Manninen et al. (2010) did not actually provide data for the puy de Dôme. I think Venzac et al. (2007) is the first work on NPF analysis at this french station. Also I think a long term analysis of NPF event is available in Boulon et al. (2011) and could complete your bibliographic analysis and fill the empty space in table 3. Similarly an interesting work by Jung, Miyazaki and Kawamura has also been published in 2013 in ACP.
- p12, l10 – l13: I think this statement does not agree with the one found in Boulon

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et al. (2011). Please check.

- p14, 15 – 19: About this ratio analysis, do the authors compare the "all period data" during the same daytime period than NPF occur? In other words, NPF is in general triggered between 9am and roughly 2pm. The ratios only have a meaning if they are all computed within the same time period, i.e. between 9am and 2 or 3pm, to avoid noise due to changing conditions during the rest of the day.
- The growth rate is strongly size dependant. At what size growth rate calculations have been performed?
- Authors observed two different nucleation modes. On figure 12, bottom panel, it seems that the first mode does not evolve while the so-called second grows. No explanation is proposed which is a bit frustrating. At least, propose some assumptions, some simple model might help.

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