

Authors deployed the ice chamber instrument at high alpine research station and measured ice crystal concentration. The analysis showed larger dust particles produced higher ice crystal concentration. The analysis could have been strengthened in the presence of instrument that characterizes the chemical composition of aerosols. However, the measurements reported here are important to constrain the climate models and I recommend the manuscript for publication after following comments are addressed.

General comments:

Please mark the location of JFJ research station in Fig 6, 7, 9 and 10.

Describe the PINC instrument in detail. Please mention the ice coating thickness, how frequently the icing is done at field site and particle losses within instrument.

Atmospheric implications of the present work should be discussed in detail. I suggest authors to add another section.

If possible ensemble of backtrajectories should be used to understand the origin of air mass. Did the calculations show similar results as would be given by HYSPLIT?

Detailed Comments:

Page 23706, line 25: Sentence 'On the other hand, aerosols 'needs reference.

Page 23707, line 10: The reference list is incomplete; there are other few groups who have done work in deposition freezing. Either specify all references or use 'for example' wording.

Page 23708, line 16: It is not clear what are PINC II and PINC III. The PINC stands for portable ice nucleation chamber, so did you use two different chamber instruments or similar instrument but with version II and III?

Page 23711, line 18: Do the RH was measured at lab or field site? Also at what temperature the RH readings were recorded. I imagine at lower temperatures the 1% RH moisture (at room temperature) leads to couple percent of RH moisture. This might influence the water vapor distribution within PINC and could affect results. Please clarify.

Page 23712, section 2.1.4: Did the PINC was operated 24 hours a day? Does the JFJ station is exposed to the free troposphere for all 24 hours of a day. I imagine during day time the conditions would be different.

Page 23713, section 2.2: Please add more details or merge within another section. I think more details are needed to complete the section. At present it is too short of details.

Page 23713, line 24: Can other aerosol types (apart from dust) can produce SSA exponent negative? If yes then it would mislead the interpretation of how dust event are observed. Please clarify.

Page 23717, line 4: Correct Fig 8 to Fig 8c.

Page 23719, section 4: Did anyone in the past looked at the chemical composition of aerosols observed at JFJ station. If yes please mention the reference. Also the Saharan dust event over Europe is well characterized to understand the dust particle chemical properties. Do the literature results show any ageing of dust particles? Variability of IN concentration shown in Fig 5 and Fig 8 is not clearly explained and could be linked to dust ageing. Please explain.