Review of "Measurement report: Ice nucleating abilities of biomass burning, African dust, and sea spray aerosol particles over the Yucatan Peninsula" by Córdoba et al.

General comment This study investigated ice-nucleating particles of size-segregated particles in tropical latitudes. Three types of common particles were studied: Marine, biomass burning and desert dust particles. Five field campaigns were conducted at two different sites in Mexico, and this is the first comprehensive study conducted in that area. The ice-nucleating abilities of the particles were tested in the new setup UNAM-MOUDI-DFT. INP concentrations varied between the different sampling events. The highest concentrations were observed during desert dust events, while the more ice-active particles were the marine aerosols, which sourced in the activity of cold front. Additionally, supermicron particles contributed most of the INPs in all particle types. This study is an important contribution to the cloud ice nucleation field, which presents a novel data collected in order to improve the understanding, characterization and quantification of ice nucleating particles. The sampling was well planned and the experiments were well designed. The results are well interpreted and clearly presented, and the data supports the conclusions. The manuscript is well written and within the scope of ACP. I recommend to accept this manuscript for publication in ACP after the authors will clarify and address the following comments.

Major Comments

1. The introduction section should include some crucial knowledge that discussed in the manuscript. What are the physical and chemical properties of an INP? The relation between particle size and ice nucleation is missing for example. The different chemistry of the three aerosol types which were studied and how this will affect their ice nucleation abilities, as well as how will atmospheric transport expected to affect their activity. Perhaps what type of minerals are commonly transported from North Africa and how will this change with particle size. It may be important to mention the presence of mineral phases which occurs in biomass burning aerosols and what are the main differences from desert dust.

2. In the section "The UNAM-DFT" there is no information about temperature calibration. I am concerned about the difference between the droplet's temperature and the detector temperature. Are they both located at the same surface? How accurate is the freezing point detection at 10 CPM ramp (**L271**)? What is the resolution of temperature acquired data? Is the temperature uncertainty (0.1 °C) remains constant down to -40 °C?

3. Consider to improve the English of the manuscript.

Minor comments

1. In the introduction section, starting from the third paragraph, there is a survey of atmospheric INP concentrations. The range of INP concentration depend on few factors, such as aerosol loading, sampling volume, and other technical issues, such as the droplets volume. It will be appreciated if the authors will add this important information to the introduction.

2. In **L304**, what was the reason for two different sampling periods? Is it the aerosol load? I think this should be explained in the text.

3. In L**373**, how 'background conditions' were determined in this study?

4. In **Figure 5**, how was the chemical composition quantified? It is written in the text that the elemental composition is obtained using XRF. There is a way to quantify the percentage of each element in this method? This should be mentioned in the text?

5. **Figure 8**, I do not understand what is the horizontal line over the bars at the higher temperatures.

6. **Table S1**, why these samples were chosen? Different air mass categories?

Technical comments:
L32: MicroOrifice should be Micro-Orifice
L33-35: Rephrase. Perhaps add "conditions" after "(AD)".
L36: Remove "characterizing".
L43: What do you mean in this final note?
L72: You referred to the different freezing mechanisms as "pathways" in L57, and as "modes" in L72. I suggest to use the same term along the manuscript.
L76: INP values in this paragraph are written in different formats. For example, 0.1 in L91 and $2 \bullet 10^{-1}$ in L93. Perhaps best to use the same format.
L86: "eastern" should be "Eastern".
L120: Remove "the" before "sea".
L123: "eastern" should be "Eastern".
L130: What do you mean "similar than"? Rephrase.
L134: -35 deg. Celsius and not per Liter.
L138: Why suddenly here you place the temperature range in brackets?
L146-148: Rephrase, this sentence does not read well.
L163: Rephrase, this part of the sentence does not read well.
L166: Consider to add "the word "these" before "three".
L169: Remove "and methods"
L191: Merida is not affected by cold front as Sisal?
L196: Rephrase.
L202: Replace "efficiency" with "properties" or similar.
L210: Remove "used" or add :"in use" after "The MOUDI".
L213: Replace "time" with "period".
L235: Where was the thermocouple placed?
L255: Remove "to"
L261: Replace "were' with "was".
L320: What do you mean by "..from the University Network…". It is where it was located?
L376: "Indicate" should be "indicates".
L377: Replace "always" with "elements".
L389: "of the coast" should be "in the coast".
L536-540: This should be placed in the methodology section.

Table 1. Which CPC model was used for 2017 BB sampling in Merida?