This comment adds on comments given to the work by Emersic et al., ACPD (2015). In addition to additional literature mentioned in Ben Murray's comment, there is more literature available which shows good comparison between dry-dispersion and wet-suspension methods, both at high temperatures (> -10°C) (see next paragraph) and for illite NX and a K-feldspar sample (see the paragraph following the next one).

Results of immersion freezing measurements of non-viable Pseudomonas syringae bacteria from three wet-suspension and four dry-dispersion methods were compared in Wex et al., ACP (2015). Altogether, 10 orders of magnitude in concentrations were covered. The examined bacteria become ice active at high temperatures above -10°C. In general, a good agreement between all participating methods was obtained (a few instrumental related issues are discussed the paper). Particularly a wet-suspension method, BIANRY (see Budke and Koop, AMT, 2015), which was also used in the comparison by Hiranuma et al., ACPD (2014), examined a range of concentrations covering 9 orders of magnitude, and data from all concentrations agreed well with each other and also agreed to those from the dry-dispersion methods.

Augustin-Bauditz et al, GRL (2014) compares data for immersion freezing of illite NX and a K-feldspar measured with our flow tube LACIS (a dry-dispersion method in which we generally examine size segregated particles) to literature data obtained with the wet-suspension method used by Ben Murrays group (see supplement of the paper, an excerpt is shown in the Figure below). A good agreement was found.

Moreover, LACIS has been found to agree well with the CFDC operated by Paul DeMott's group. Good agreement between data presented in Tobo et al., ACP (2014) and Wex et al., APC (2014) was already mentioned by Ben Murray. Additionally, Wex et al., ACP (2014) contains a further comparison between additional data-sets from the CFDC and LACIS for different kaolinite samples (2 different kaolinites and different coatings, altogether 19 different particle types). Niedermeier et al., ACP (2011) contains data for Arizona Test Dust from CFDC and LACIS. Comparison between data from CFDC and LACIS is generally good, and always still slightly improved if the time-dependence of the ice nucleation process is accounted for, owing to the short residence time in LACIS.

All of that gives us confidence that a) LACIS compares well with other dry-dispersion based immersion freezing measurement devices (justifying further comparisons) and that therefore b) dry-dispersion and wet-suspension methods might agree better, overall, than it seems to be implied in the work by Emersic et al., ACPD (2015). This should be discussed in the work under review. Alternative explanations for why data from MICC exceeds those from the Leeds group and from other methods have to be added. Aggregation alone might not be a feasible explanation (as already elaborated on in the other posted reviews and comments).

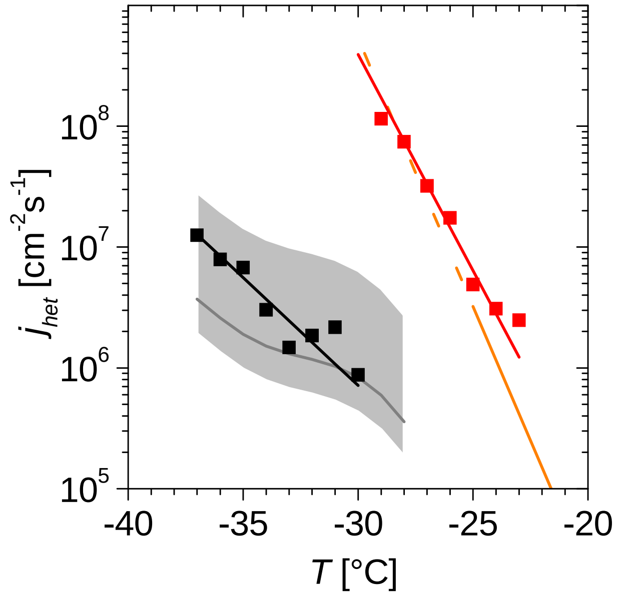

Figure S1 (from Augustin-Bauditz et al., GRL (2014), supplement): Calculated nucleation rate co-efficients for K-feldspar and illite NX as function of temperature. Symbols in red (K-feldspar) and black (illite NX) show data obtained from LACIS, together with the respective fits (lines). The orange and grey lines represent data from Atkinson et al., Nature (2013) for K-feldspar and Broadley et al., ACP (2012) for illite NX, respectively. The grey shaded area represents the uncertainty in the conversion from surface areas based on BET to those based on the assumption of spherical particles.

Literature:

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