

# ***Interactive comment on “Characterization and first results from LACIS-T: A moist-air wind tunnel to study aerosol-cloud-turbulence interactions” by Dennis Niedermeier et al.***

**Anonymous Referee #2**

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General Comment: This manuscript presents the newly developed turbulent moist-air wind tunnel, called the Turbulent Leipzig Aerosol Cloud Interaction Simulator (LACIS-T). LACIS-T is able to study different cloud processes taking into account interactions between turbulence and cloud microphysical processes. Additionally, the authors complemented their LACIS-T experiments with Computational Fluid Dynamics (CFD) simulations to explain their observations. The behavior of the LACIS-T was tested by performing deliquescence and hygroscopic growth as well as droplet activation and growth experiments using NaCl particles.

This is as well written manuscript, with a very detailed descriptions of this newly devel-

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oped turbulent moist-air wind tunnel. The LACIS-T is a great and valuable instrument for the cloud physics community that can be used to fulfill many gaps in knowledge. Given the lack of instruments like this, LACIS-T can have a huge impact in the near future. I congratulate the authors for developing such a great instrument and for the careful characterization. I only have one “Major Comment”. The manuscript can be accepted after the following minor comments are added to the revised manuscript.

**Major Comment:** It would have been nice to add a reference experiment, especially for the droplet activation experiments. I mean, is it possible to run a droplet activation experiment under steady conditions, i.e., without any turbulence? This will show how monodisperse is the droplet size distribution (DSD) in comparison to the DSD shown in Figure 12.

**Minor Comments:** L19: Add a reference after “Earth”. L20: Add a reference after “interactions”. L24: Add a reference after “scales”. L28: I suggest to add other references in addition to Siebert et al. (2006). L28: “It links to phase transition processes”. Do the authors refer to “turbulence”? L34: Add a reference after “undertaking”. L37: I suggest to add other references in addition to Stratmann et al. (2009). L40: How about Cziczo et al. (2017)? L44-49: I do not think it is necessary to cite all this previous papers. L50: I think “those of the other” should be “those of other”. L51: Add a reference after “interactions”. L62-73: Much of the information provided here can go into methods. L104: “to remove aerosol particles”. In the particle-free air? L137: “Condensational” should be “Condensation”. L140: Delete “and” before 200. L259-260: “Large Eddy Simulations” should be “LES”. L302: I suggest to change it to “Figs. 5a-c” L333 and 335: “RMS” should be in lowercase? L398: “size-selcted” should be “size-selected”.

**Reference:** Cziczo, D. J.; Ladino, L. A.; Boose, Y.; Kanji, Z. A.; Kupiszewski, P.; Lance, S.; Mertes, S.; Wex, H. Measurements of Ice Nucleating Particles and Ice Residuals. In *Ice Formation and Evolution in Clouds and Precipitation: Measurement and Modeling Challenges*; American Meteorological Society, 2017; Vol. 58, pp 8.1–8.13

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