

Development of a drop Freezing Ice Nucleation Chamber (FINC)



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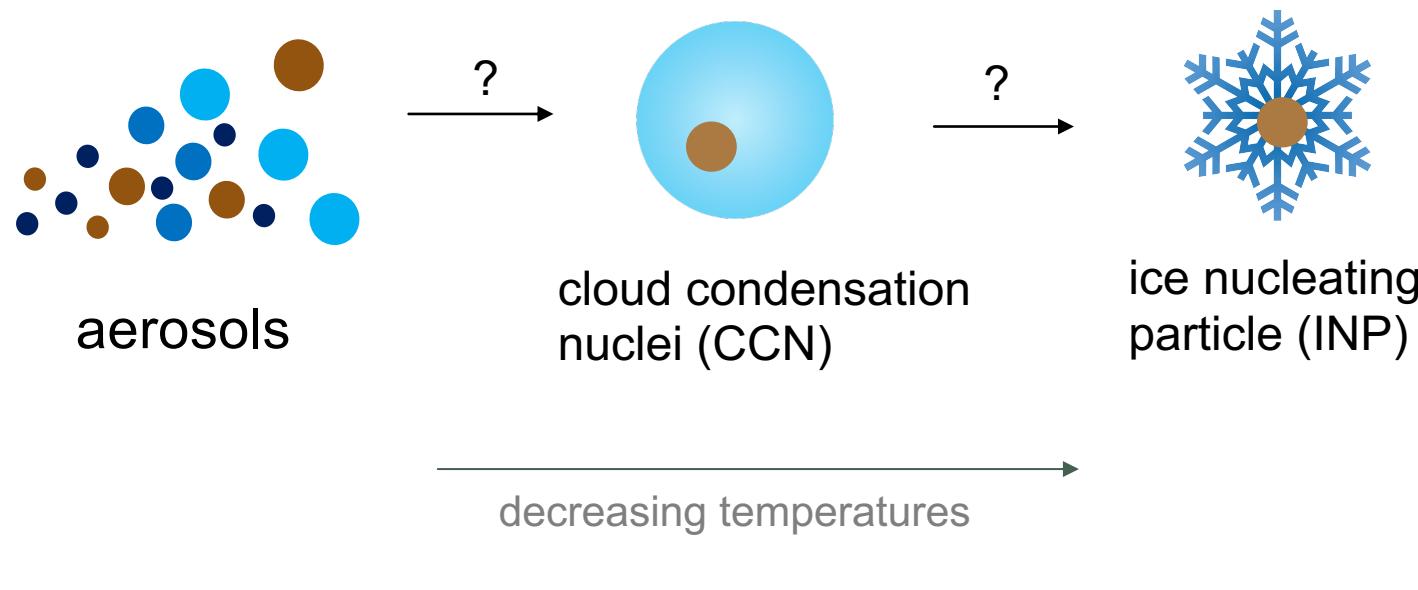
University
of Basel



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EGU 2020

The importance of immersion freezing in mixed phase clouds

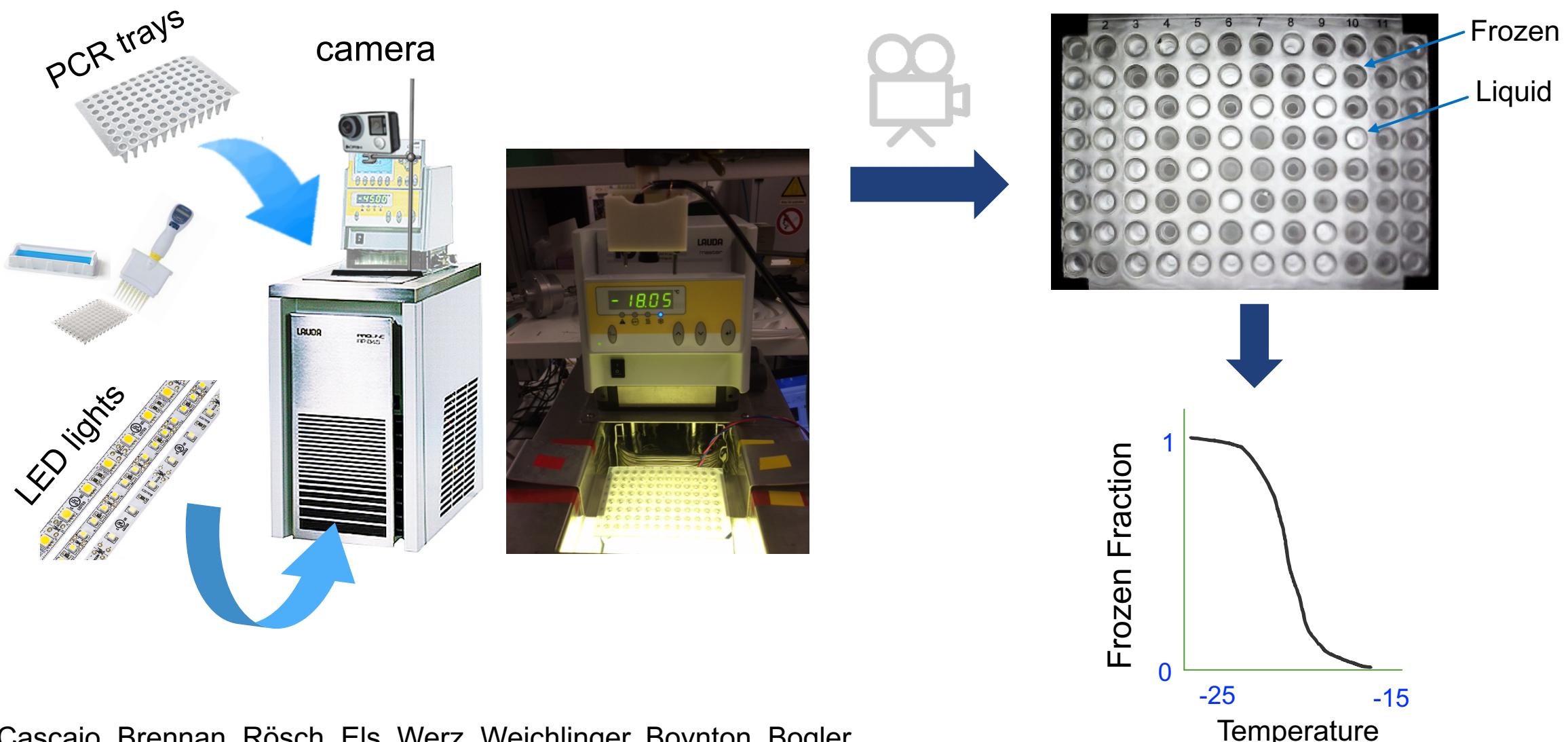


[aerosols] \gt [CCN] \gg [INPs]

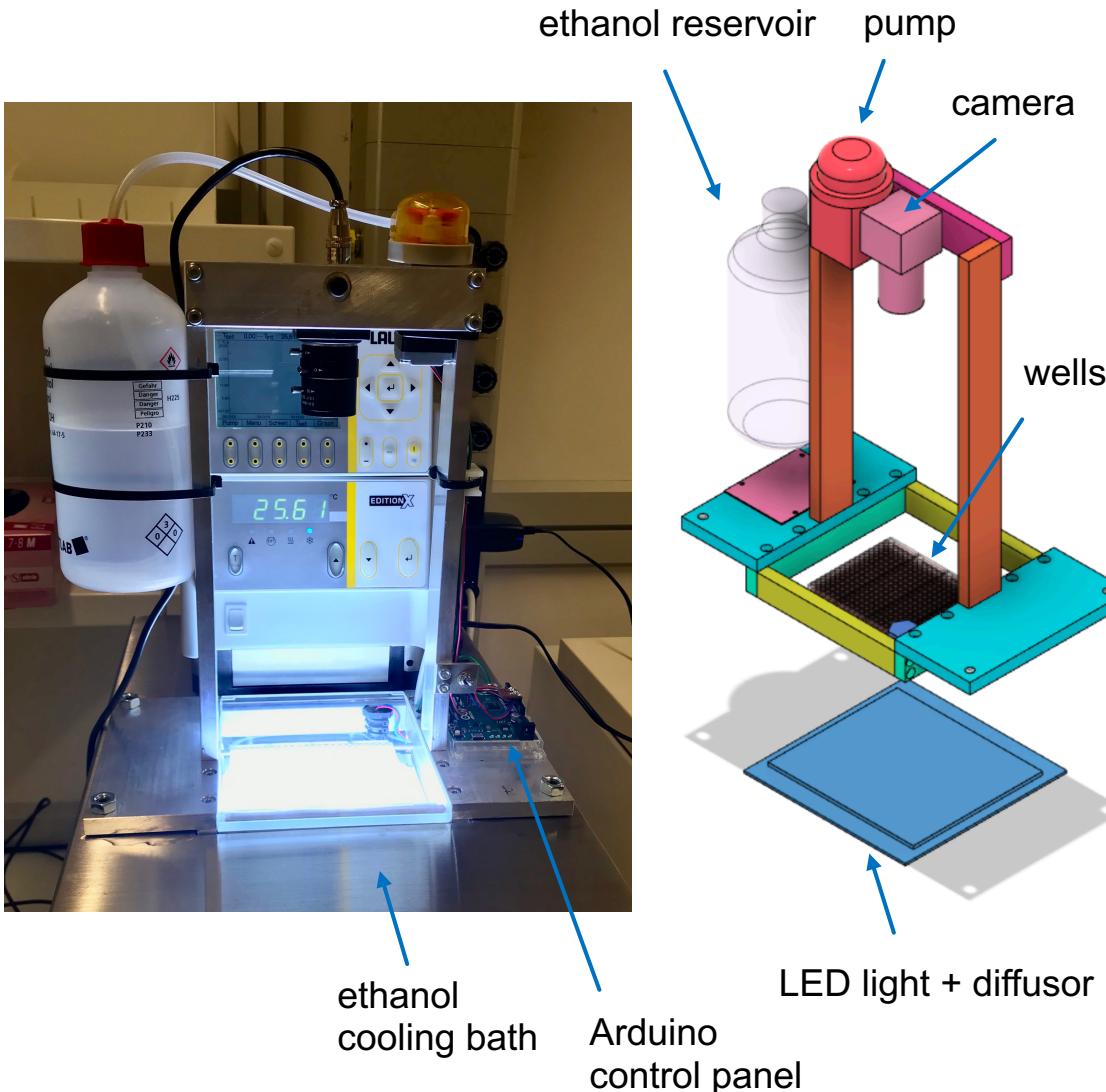


Mixed-phase cloud
Immersion freezing
50% of precipitation
20% of global coverage

Method: DRop Freezing Ice Nuclei Counter Zurich (DRINCZ)

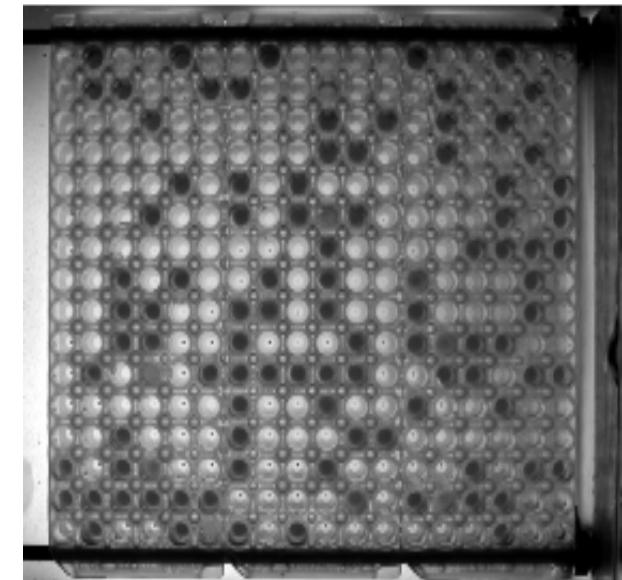


Introducing the new drop Freezing Ice Nuclei Counter (FINC)!

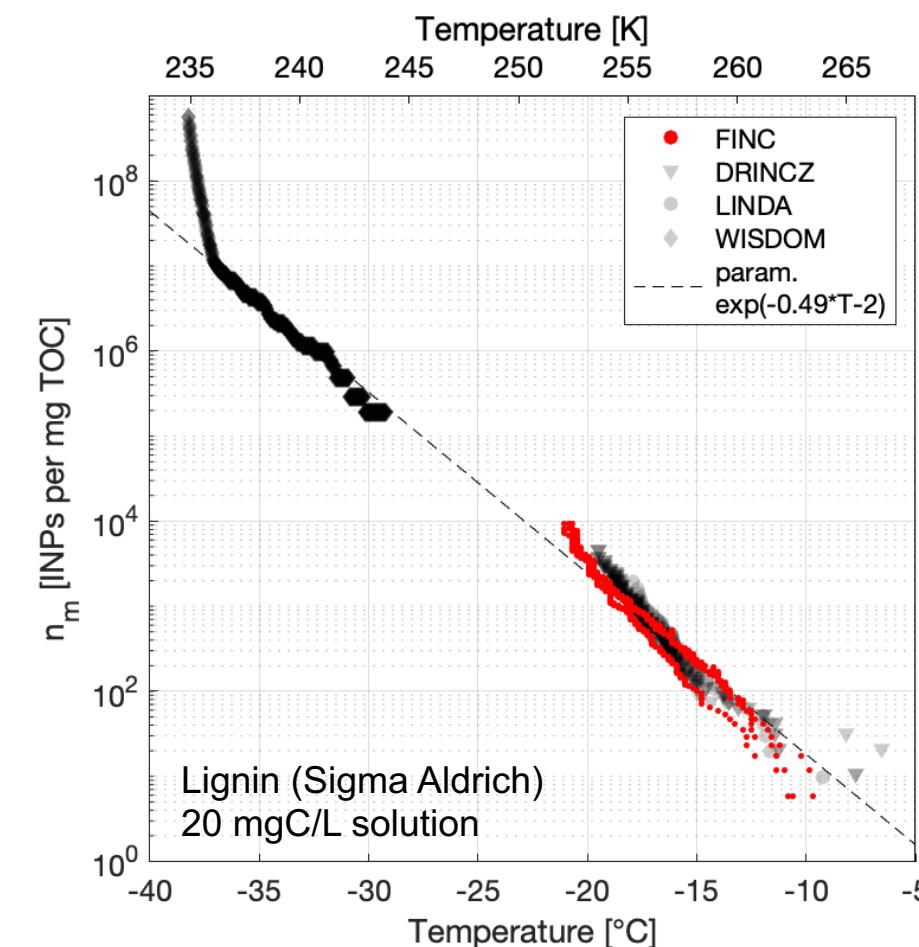
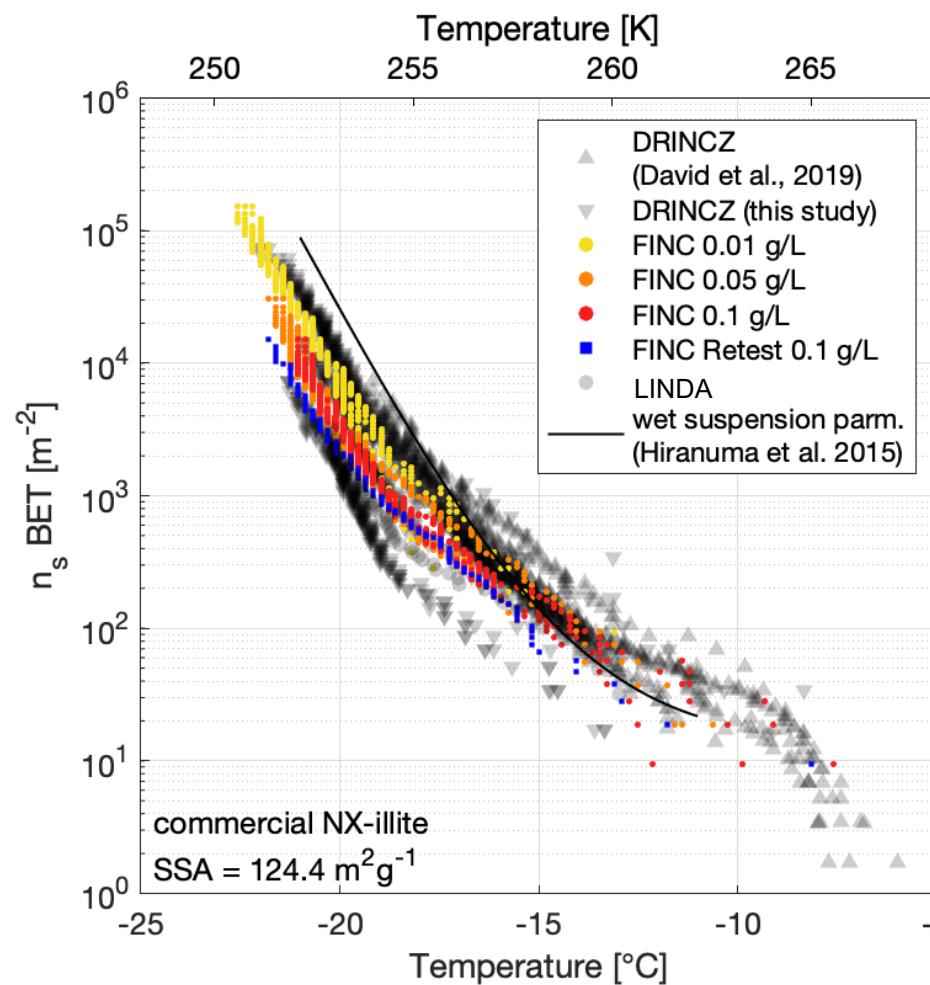


Upgrade from DRINCZ:

- Smaller volumes ($5 \mu\text{L}$)
- Lower background ($T_{50} - 25^\circ\text{C}$)
- More wells (288)
- Automated bath leveling



FINC Validation: Intercomparison using NX-illite and lignin



- FINC measurements compare well with the other instruments for both NX-illite suspensions and lignin solution

Applications of FINC

- Well suited for quantifying immersion freezing of INPs active at moderate supercooling (between -10 and -25 °C)
- For example:
 - Organic macromolecules
 - see presentation of Nadine Borduas-Dedekind
 - Lignin
 - see presentation of Sophie Bogler
 - Ambient organic aerosol
 - see presentation of Silvan Müller
 - Biomass burning aerosol
 - see presentation of Sophie Bogler
 - Dissolved organic matter from lakes and rivers