

— THE PROBLEM

Natural cloud droplet forms well below 30 °C.

Your CCN counter **can't**.

- ✗ **High T in CCN column** → Enhanced partitioning (evaporation) of semi-volatiles from particle to gas phase → biased CCN activity
- ✗ **Reliable lower SS level $\approx 0.13\%$** → struggles with highly hygroscopic particles ($\kappa \approx 0.92$, $D_{\text{crit}} > 100\text{ nm}$)
- ✗ **Stepped SS scans** — minutes lost per stabilization, lost data

— THE SOLUTION

Meet the Horizontal CCNC.

4 °C

min T (validated)

0.05 %

min SS (validated)

$\approx 2\times$

wider Dcrit (any κ)

$\approx 7\times$

faster SS scan

I will be presenting HCCNC and its unique features on:
Oral | Wednesday, 06 May, 15:05–15:15 (CEST) | Room M1

[See back page →](#)

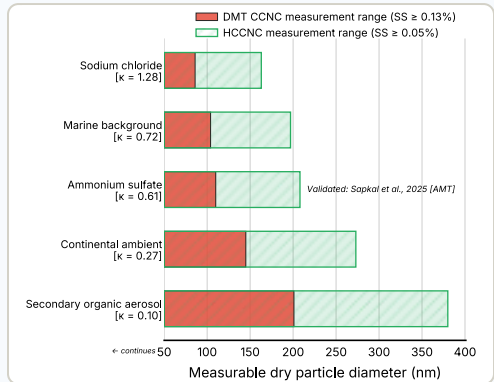
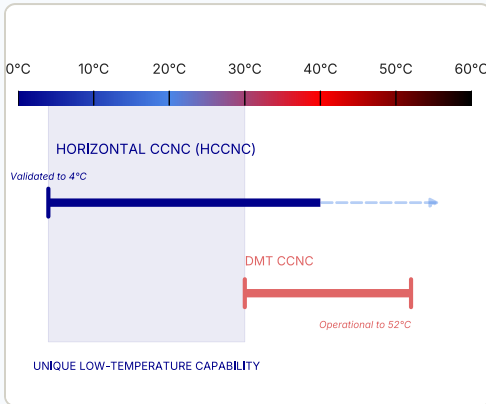


Download the e-version of this flyer & presentation
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— VALIDATED

Empirically validated. (Sapkal et al., AMT 2025)



Measurable size range at each instrument's SS floor. κ -Köhler based equation only; $(\text{NH}_4)_2\text{SO}_4$ validated for HCCNC.

Temperature range over which each instrument generates supersaturation. DMT CCNC sample T assumed 25 °C.

| Capability | DMT CCNC | HCCNC |
|---------------------------|--------------------|---------------------|
| Min. supersaturation | 0.13 % | 0.05 % |
| SS generation temperature | ≥ 30 °C | down to 4 °C |
| Data loss during SS cycle | seconds to minutes | ✓ none |
| Estimated repair time | months | ~ 2-3 weeks |

WHAT HCCNC'S CAPABILITIES WILL ENABLE (HYPOTHESIS)

- Low T:** preserve semi-volatiles | T-based CCN analysis | study of co-condensation
- Low SS:** highly hygroscopic particles | surfactant lowering SS_{crit}
- Faster stable SS cycle:** ideal for rapidly changing air masses
- Dynamic residence-time control:** kinetic growth studies

COMMERCIALIZATION & DEPLOYMENT

Patent filed · Active pilot discussions underway in EU & India

SOURCES

Romakkaniemi et al., AMT 2014 · Sapkal et al., AMT 2025 · Sapkal, Diss. ETH No. 31907 (2026)