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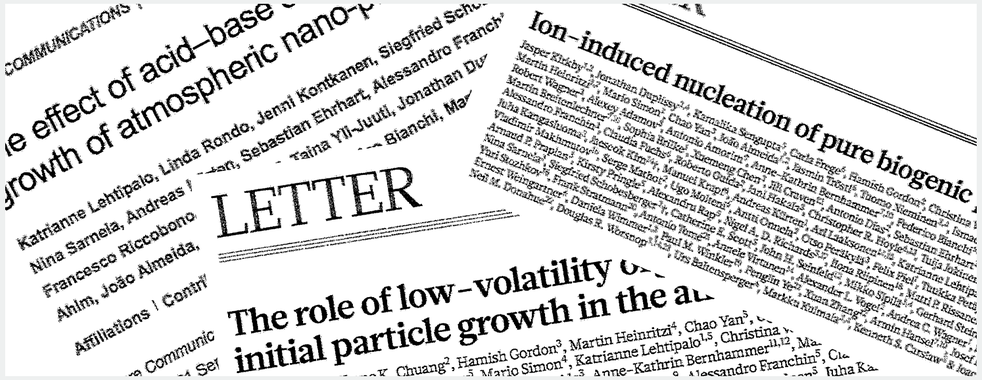
The successful CLOUD project keeps generating groundbreaking knowhow on new aspects of the climatic effects of aerosol particles

Many discoveries related to the early stages of atmospheric aerosol particle nucleation and growth have been published during the past couple of weeks based on CERN CLOUD chamber measurements. Scientists have studied nanoparticle growth starting from the molecular cluster formation.

Kirkby et al. (2016) have presented evidence from atmospheric chamber studies that aerosol particles can form from highly oxidized biogenic vapours in the absence of sulphuric acid. Another publication (Tröstl et al. 2016) based on the same set of experiments focuses on the growth of the nucleated particles. Tröstl et al. have shown that the organic vapours that drive the initial growth have extremely low volatilities.

According to Lehtipalo et al. (2016) "the growth of freshly formed aerosol particles can be the bottleneck in their survival to cloud condensation nuclei", which is one of the reasons why it is important to increase the understanding of the initial particle growth process in the atmosphere. In their study, Lehtipalo et al. found that atmospheric ions and small acid-base clusters can participate in the growth process, enhancing particle growth rates.

The PSM was used in the measurements of sub-3 nm particles. "Being able to measure both the concentration and composition of the nucleating clusters and their precursors has played a crucial role in these new discoveries" says Dr. Katrianne Lehtipalo.


COMMUNICATIONS

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rowth of atmospheric nano-p

Katrianne Lehtipalo, Linda Rondo, Jenni Kontkanen, Siegfried Schob
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Ahlm, João Almeida,
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LETTER

Ion-induced nucleation of pure biogenic

The role of low-volatility
initial particle growth in the a

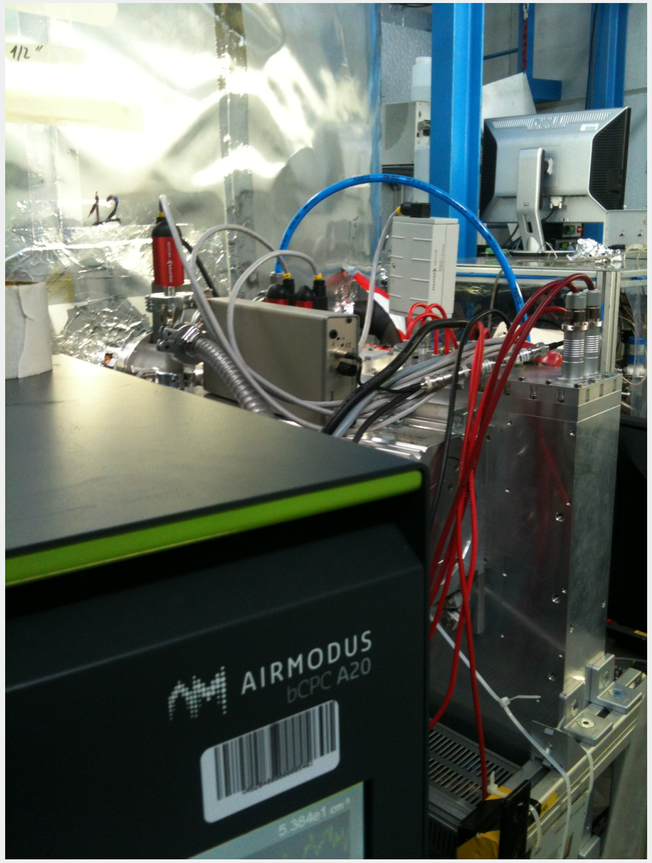
Lehtipalo et al. The effect of acid-base clustering and ions on the growth of atmospheric nano-particles. Nature Communications 7, 11594, 2016

Tröstl et al. The role of low-volatility organic compounds in initial particle growth in the atmosphere. Nature vol. 533, pp. 527-531, 2016

Kirkby et al. Ion-induced nucleation of pure biogenic particles. Nature, vol 533, pp. 521-526, 2016

The CLOUD project website: cloud.web.cern.ch

In questions related to the Airmodus Newsletter please contact Elina Miettinen (elina.miettinen@airmodus.com)



Instrumentation at the CLOUD measurement facility.

Photograph courtesy of Katrianne Lehtipalo.