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# New particle formation observed in a french megalopole

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## Résumé

Ultrafine particles (UFPs,  $D_p < 100\text{nm}$ ) are known to penetrate deep into the respiratory system and also affect the cardiovascular and central nervous systems (Costa, et al. 2019). Despite their health impact, UFPs are not routinely monitored nor considered in emission regulations. Over urban area, two main sources of UFPs can be distinguished: (1) UFPs issued from anthropogenic activities (traffic, house heating etc...) containing high amount of carbon and (2) UFPs formed naturally through NPF. To develop effective and efficient strategies to reduce UFP emissions, a better understanding of their spatial and temporal variability as well as the contribution of anthropogenic emissions is crucial. UFP are continuously measured at the AtOLL site in Lille since 2017. Events of new particle formation (NPF) have been observed over the site with a SMPS. A strong seasonal variation of the New Particle Formation (NPF) occurrences was observed with a maximum observed during spring and summer. The data analysis highlight a large contribution of NPF events on the number concentration of fine particles ( $D_p < 100\text{nm}$ ) in comparison to other regional sources. The LOOKUP network (ANR AAPG 2023) could be deployed within the Lille metropolis to measure the UFP size distribution and allow the identification of UFP sources (anthropogenic and natural) over a long campaign (at least a year). Over intensive period of observations (several weeks), mobile measurements will be deployed within the city to have a better understanding to better understand the effects of atmospheric dynamics on these events. Finally, **one objective** of this project is to characterize the toxicity of UFPs using cultures of human lung cells exposed to controlled or real atmosphere. Mechanisms of cell death, inflammatory response and metabolization of xenobiotics will be then evaluated.

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\*Intervenant

**Mots-Clés:** UFP, network