

Master 2: Research Training 2023-2024

Laboratory: LOA

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Eventually CaPPA Work Package:

Ultrafine Particles (UFP): Study of their Variability on the ATOLL Platform

Ultrafine particles (UFP) present in the atmosphere have become a concerning topic due to their potential impact on air quality and human health. In Lille, the concentration of particles with a diameter between 20 and 30 nm has been steadily increasing over the past 7 years (240 # ccm-3/year, Suchenkova et al., in preparation). UFPs result from a complex combination of natural and anthropogenic sources, contributing to the diversity of their composition and characteristics. Human activities, such as the combustion of fossil fuels, industrial emissions, and traffic, constitute major anthropogenic sources of UFP, significantly contributing to the rise in their concentration in the air. Understanding the relative contribution of natural and anthropogenic sources of UFP is essential for developing effective air quality management strategies and mitigating potential impacts on human health and the environment.

Observations have been conducted at the ATOLL site (Atmospheric Observations in LiLle) to measure the physical, optical, and chemical properties of aerosols. In particular, particle size distributions (measured by SMPS) and the chemical composition of particles (from ACSM and AE33 measurements), continuously monitoring since 2017, will be analyzed synergistically. The application of a factorization algorithm on the Particle Number Size Distributions (PNSD) will help determine a limited number of characteristic PNSD groups for the site. Chemical (and, if time allows, meteorological) characteristics will then be associated with each PNSD group, contributing to refining the origin of these UFPs.