

1.029 Chemical characterization of ultrafine particles in aircraft emissions observed in the Narita International Airport, Japan: Possible contributions of fuel and lubricating oil.

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Abstract:

Aircrafts (jet engines) emit large number of ultrafine particles. However, the chemical composition and sources of aircraft exhaust particles (e.g. fuel, lubricating oil) are not well understood. To reveal them, we conducted a field measurement in the Narita International Airport, Japan. The measurements were conducted at 140 m west of the runway A in winter (February 2018). Size-resolved ambient particles were simultaneously collected with two cascade impactors (NanoMoudi-II, MSP, USA, from 10 nm to 10 μ m) using gold foils and polycarbonate filters as the collecting substrates. To differentiate the effect of aircraft emissions, the samples were collected during daytime (aircrafts fly) and nighttime (aircrafts do not fly), respectively. The particulate mass, elemental/organic carbon, organic compounds, and trace elements were measured. For comparison, organic components and elements in jet fuels (Jet-A1) and jet oils (Mobil Jet oil II and Mobile Jet oil 254, ExxonMobil, USA) were also analyzed. Based on these measurements, the chemical composition and sources of aircraft exhaust ultrafine particles are discussed.