



New particle formation observed in the upper troposphere and lower stratosphere

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Particle nucleation in the upper troposphere and lower stratosphere (UT/LS) is an important step of the chain reactions that lead to cloud formation, but the mechanisms are poorly understood. We present observation results of ultrafine particles obtained from several NASA high altitude research aircraft campaigns. These measurements show that new particle formation takes places in the typical conditions of sulfur dioxide, relative humidity, and temperature of UT/LS with sufficient sun exposure and low surface area density of pre-existing aerosol particles. These results, together with numerical predictions of ion-induced nucleation provided by E.R. Lovejoy, indicate that ion-induced nucleation is important for particle formation in the UT/LS.