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What you can't see can hurt you - measurement of airborne nanoparticles

Greenhouse gases lead to global warming, which is partially counteracted by aerosols that scatter sunlight to space, both directly and by acting as cloud condensation nuclei, and that dominate the uncertainty in the global radiative energy budget. Half of the particles in the global atmosphere are formed in the air from products of gas-phase reactions of gaseous precursors. Sulfuric acid is the primary anthropogenic precursor in the modern atmosphere, but its concentration is so low that other species are required to grow the nuclei to sizes that affect climate. Once nuclei are formed, they may be lost by coagulation with pre-existing aerosols, or other species grow them large enough that they can activate and grow to form cloud condensation nuclei that can affect climate. Measurements of cluster formation and early growth into stable particles reveal mechanisms that explain the role of new particle formation in climate forcing. Surprising new findings even show how new particles can even form and grow in the most polluted megacities, affecting both air pollution and climate forcing. In addition to posing new challenges for modeling and controlling air quality, these recently identified mechanisms pose new measurement challenges for understanding climate forcing.

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