

Ayse Koyun is a Postdoctoral Scientist at the Department of Environmental Science and Engineering and the School of Engineering and Applied Sciences at Harvard University. She holds a Doctor degree in Technical Chemistry (materials science) from the Technical University of Vienna.

During her PhD, Ayse focused on materials characterization using atomic force microscopy and investigated the ageing of construction materials. As a postdoctoral scientist at Harvard University, her research now centers on understanding the impact of aerosols—tiny particles suspended in the air—on climate and human health. She explores how activities like construction generate these particles and how they may affect the well-being of those who inhale them.

At Harvard, Ayse employs a cutting-edge technique called electrodynamic levitation to suspend aerosol particles in mid-air, enabling her to study how they evolve when subjected to various conditions, such as light exposure and humidity changes. She examines particles from diverse sources, ranging from smoke produced by burning plants to specific chemical compounds. By illuminating these levitated particles, she observes their reactions and transformations, shedding light on the behavior of aerosols in the environment and their potential influence on climate.

In addition to her work at Harvard, Ayse contributes to the SABRE (Stratospheric Aerosol processes, Budget and Radiative Effects) mission, an extended airborne science measurement program that studies the transport, chemistry, microphysics, and radiative properties of aerosols in the upper troposphere and lower stratosphere (UTLS). Utilizing the NASA WB-57 high-altitude research aircraft, Ayse helps characterize the tiny aerosols collected during the mission. The SABRE deployments provide extensive detailed measurements of aerosol size distributions, composition, and radiative properties, along with relevant trace gas species in different regions and seasons. These observations are crucial for improving the ability of global models to accurately simulate the radiative, dynamical, and chemical impacts of changes to stratospheric aerosol loading.

Ayse's overarching goal is to provide crucial insights into the origins, transformations, and effects of aerosol particles on our world. By contributing to the advancement of climate models and the development of strategies to mitigate the adverse impacts of aerosols, she aims to make a meaningful impact on both climate research and public health. Ultimately, the experimental data she gathers, both in the laboratory and through the SABRE mission, serve to refine global chemistry-climate models, bridging the gap between scientific findings and large-scale simulations.

