

Atmospheric particulate matter and its impacts on climate, public health and ecosystems

Human activities profoundly alter the composition of the atmosphere, leading to a cascade of effects on climate, ecosystems and human health. Atmospheric particulate matter, or aerosols, play a central role in all these changes; they affect climate by modulating the Earth's energy balance, clouds and precipitation; they contain toxic compounds which upon inhalation cause millions of premature deaths every year. The same particles also contain substances that act as nutrients when deposited in ecosystems, which in turn can affect primary productivity. Much of the predictive uncertainty surrounding human impacts on the Earth System are related to poorly understood processes involving the emission, transformation and related impacts of atmospheric aerosol. This talk will present key aspects of these aerosol-related impacts, findings, directions and future outlook. The implications for the environment in the Eastern Mediterranean and Greece will be emphasized.

Short Bio: Athanasios Nenes is a affiliate researcher of the Institute of Chemical Engineering Science at FORTH and a founding member of the Center of Studies on Air quality and Climate Change at the institute. He is also Professor of Atmospheric Processes and heads the Laboratory of Atmospheric Processes and their Impacts (LAPI) at the École Polytechnique Fédérale de Lausanne, Switzerland. He is a Web of Science Highly Cited Researcher, having authored/co-authored 310 manuscripts (Google Scholar citations: 29335, $h=92$). His research focuses on the impact of atmospheric processes (especially aerosol) on clouds, climate, air quality and ecosystems. He is the prime author of the ISORROPIA aerosol thermodynamics models, and developer of instrumentation to measure aerosol properties and Cloud Condensation Nuclei. He is active President of the Atmospheric Sciences Division of the European Geophysical Union, and member of numerous groups including the UN Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (WG38: Atmospheric input of chemicals to the ocean), the Committee on Nucleation and Atmospheric Aerosols. He served on the US National Academies Committee on the Future of Atmospheric Chemistry Research (2014-2016), Secretary of Atmospheric Sciences of the American Geophysical Union (2012-2016), Board of Directors of the American Association for Aerosol Research (2014-2017) and Editor in the Copernicus journal *Atmospheric Chemistry and Physics* (2004-2019). He is an American Association for Aerosol Research Fellow (2021), a member of the Academia Europaea (2021) and an American Geophysical Union Fellow (2020). He is also recipient of the Copernicus medal of the Copernicus e.V. (2022); ERC Consolidator Grant (2016); Ascent Award, American Geophysical Union (2012); Whitby Award, American Association for Aerosol Research (2011); Houghton Award, American Meteorological Society (2009); Sigma Xi Young Faculty Award (2007); Friedlander Award, American Association for Aerosol Research (2005); NASA New Investigator Award (2004) and a National Science Foundation CAREER Award (2004).