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Current and future satellite observations of aerosol types affecting human health

Airborne particulate matter (PM) is currently recognized as a top environmental risk factor worldwide, responsible for ~3 million premature deaths per year. While PM is a well-known cause of heart disease, cardiovascular and respiratory illness, low birth weight, and lung cancer, the relative toxicity of specific PM types-components having different sizes and chemical compositions is currently poorly understood. Based on solid evidence that health effects depend jointly on PM size and composition, the World Health Organization has stressed the importance of filling this gap in our understanding of the associations between specific sources of PM types (both natural and anthropogenic), particle atmospheric transport, and health impacts on a global scale. That knowledge would help to prioritize PM source-specific intervention and emission control policies to maximize protection of human health. We will summarize PM information available from current generation of aerosol-specific satellite instruments: MODIS (multispectral), MISR (multispectral, multi-angle), and POLDER (multispectral, multi-angle, polarimetric), and review applications of these measurements for epidemiological studies. In addition, we will discuss a pathway toward identifying the most toxic components of PM that occurred recently with the selection of the Multi-Angle Imager for Aerosols (MAIA) investigation as part of the NASA Earth Venture Instruments (EVI) program. MAIA is a targeting instrument that will acquire observations over roughly a dozen globally distributed metropolitan areas with science focused specifically on the PM types/health connection. This means that the MAIA targeted approach is a pathfinder toward a more powerful, global, space-based aerosol and PM measurement system.

Biography

Olga V Kalashnikova is an aerosol scientist of Multi-angle Imaging SpectroRadiometer (MISR) team at the Jet Propulsion Laboratory (JPL) and a science team member of MISR, PACE and MAIA satellite teams. She graduated from the University of Colorado, Boulder with a PhD degree from the Department of Astrophysical, Planetary and Atmospheric Science (APAS) in 2002 and joined JPL in the fall of 2002 as a National Research Council Post-doc. She has been serving as a vice-chair of COSPAR commission A since October 2012 and as a member of Atmospheric Observational Climate Panel since March 2016.

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