

4.204 A study of 2016 Winter Fog Season in Islamabad, Pakistan.

Presenting Author:

Farrukh Chishtie, SERVIR-Mekong, Asian Disaster Preparedness Center, Bangkok, Thailand, farrukh.chishtie@adpc.net

Co-Authors:

Gufan Bulbul, Department of Space Science, Institute of Space Technology, Islamabad, Pakistan

Imran Shahid, Department of Space Science, Institute of Space Technology, Islamabad, Pakistan

Muhammad Zeeshan Shahid, King Abdullah University of Science and Technology, Thuwal 23955-6900, Saudi Arabia

Rabia Ali Hundal, Department of Space Science, Institute of Space Technology, Islamabad, Pakistan

Fatima Zahra, Department of Space Science, Institute of Space Technology, Islamabad, Pakistan

Muhammad Imran Shahzad, Department of Meteorology, COMSATS Institute of Information Technology, Islamabad 45550, Pakistan

Abstract:

PM₁₀ samples were collected during intensive fog days in Islamabad, Pakistan, to investigate the impact of particulate matter on fog formation. The PM₁₀ concentrations were monitored at the Institute of Space Technology site using a highvolume air sampler and its elemental composition was studied using Scanning Electron Microscopy-Energy Dispersive Spectroscopy (SEM-EDS). Sampling was done for a duration of 24 hours on selected days, including all foggy days in a period from January 2016 to February 2016. The concentration of PM₁₀ varied from 123 $\mu\text{g m}^{-3}$ to 202 $\mu\text{g m}^{-3}$ with an overall mean concentration of 177 $\mu\text{g m}^{-3}$. On most occasions, PM₁₀ levels were considerably high as compared to permissible limits of both Pak-NEQS and WHO guidelines. It has been observed that the air quality during fog days was much worse, with elevated levels of particulate matter observed during foggy days. The SEM-EDS revealed the presence of different elements including some metals Si, K, Ca, Mg, Zn, Fe, Cr, Pb, Al etc. The morphological studies suggest that most of the particles are crystalline in shape, suggesting their main source as soil. Some samples also showed round spherical shape which refers their anthropogenic source. The sun photometer observations of aerosol optical depth (AOD) and satellite observations from Aqua's Moderate-resolution Imaging Spectro-radiometer (MODIS) showed significant correlation. Moreover, elevated level of AOD were found during heavy fog days. The validated high satellite AOD were associated with high PM₁₀ concentration during heavy fog days.