Overview and description of IMPROVE

Charles E. McDade

The Interagency Monitoring of Protected Visual Environments (IMPROVE) network tracks the concentration and chemical composition of haze aerosols at about 170 locations in mostly rural locations throughout the United States. IMPROVE began collecting samples in 1988 with a network of about 30 sites. A major expansion around 2000 brought the network to its current size.

IMPROVE collects 24 h samples of particulate matter with aerodynamic diameters less than 2.5 □m ($PM_{2.5}$) and less than 10 □m (PM_{10}) at a frequency of every third day. Four samples are collected on each sample day: $PM_{2.5}$ on polytetrafluoroethylene (PTFE) filters, $PM_{2.5}$ on nylon filters, $PM_{2.5}$ on quartz filters, and PM_{10} on PTFE filters. The PTFE $PM_{2.5}$ samples are weighed and then analyzed for elements by x-ray fluorescence (XRF) and light absorption (F_{abs}). The quartz $PM_{2.5}$ samples are analyzed by thermal optical reflectance (TOR) analysis for carbon and the $PM_{2.5}$ nylon samples are analyzed by ion chromatography for the major anions. The PTFE PM_{10} samples are weighed.

The IMPROVE aerosol sampling network is managed by Crocker Nuclear Laboratory at the University of California at Davis (UC Davis), which also conducts the gravimetric, elemental, and light absorption analyses. Carbon analysis is conducted at the Desert Research Institute of the University of Nevada, and ion analysis is conducted at Research Triangle Institute. Each site is serviced by a local operator, often a park ranger or firefighter. The local operator visits the site once a week to change the filters and to record sampling parameters.

Data are processed and validated at UC Davis and are delivered to the Cooperative Institute for Research in the Atmosphere (CIRA). The final ambient concentration data are available for open, public downloading on this website: http://views.cira.colostate.edu/fed/.

IMPROVE data are widely used by researchers, regulators, and policy-makers. Regional Haze Rule (RHR) analysts are among the principal users of IMPROVE data. The RHR, enacted in 1999, was issued to improve visibility in Class I areas across the country, such as National Parks and wilderness areas. IMPROVE data are used to track long-term progress in achieving the RHR goals.

Charles E. McDade, Crocker Nuclear Laboratory, University of California, Davis, CA 95616, cemcdade@ucdavis.edu, (530) 752-7119