Earth science data and tools produced by NASA and other research agencies are a great potential resource for air quality management. They offer unique information on emissions and their trends, pollution monitoring and exposure, attribution of exceptional events, transport on interstate and international scales, and links to climate change. The NASA Air Quality Applied Sciences Team (AQAST) focuses on tapping this resource and delivering the specific products that air quality managers need, in a format that they can readily use. AQAST continuously seeks to expand its scope and services, and we hope that this issue of EM will inspire readers to follow our activities and partner with us in the future.

Satellite observations are of central interest to AQAST. Satellites have revolutionized our observation system of atmospheric composition over the past two decades, providing continuous data for the entire Earth. Many of the species observed from space are directly relevant to air quality, including particulate matter (PM), ozone, carbon monoxide, nitrogen dioxide, formaldehyde, ammonia, and methane. Satellites can monitor concentrations, track interstate and international transport, identify and quantify emissions, and diagnose exceptional events. Capabilities for observing air quality from space began in 1995, have been increasing steadily since, and will continue to expand in the future. The TropOMI instrument of the European Space Agency (ESA), to be launched in 2015, will provide daily global mapping with 7x7 km² resolution. The NASA TEMPO instrument, to be launched in geostationary orbit in 2019, will provide hourly data over all of North America with 2x2 km² resolution.

The potential of satellite data to benefit air quality management is too great to be ignored. AQAST bridges the gap between air quality managers and satellite data products. Articles in this month’s issue report recent achievements, including Liu for PM monitoring, Hu et al. for air quality forecasting, and Streets et al. for quantifying emissions. AQAST also develops user-friendly tools such as the Wisconsin Horizontal Interpolation Program for Satellites (WHIPS) to access satellite data imagery for selected domains and times, and the Remote Sensing Information Gateway (RSIG) to download processed data in easy-to-read formats. AQAST collaborates with the NASA Applied Remote Sensing Training (ARSET) in holding regular training workshops for air quality managers and analysts. Many AQAST members are air quality modelers and understand the special challenges—and also the opportunities—of working with satellite data for air quality applications.

But AQAST is not only about satellites. It also seeks to exploit Earth science data collected from aircraft and surface sites. For example, it partners with the ongoing NASA DISCOVER-AQ series of aircraft campaigns providing detailed information on air quality processes in different areas of the country (Baltimore-Washington, California Central Valley, Houston, and next year the Colorado Front Range). AQAST further uses Earth science models to address emerging problems in air quality, such as intercontinental transport of pollution and climate-aerosol-chemistry interactions. The articles by Fiore et al. and Mickley et al. are examples of these activities.

AQAST was established in 2011 with the appointment of 19 members each with five-year terms. All...
AQAST projects involve close partnerships with air quality managers at the local, state, regional, and national levels. Projects are often initiated by requests from air quality managers. AQAST is designed to be highly flexible in allowing members to shift resources quickly as air quality issues evolve. Each AQAST member manages individual projects, and members also pool their expertise in annual “Tiger Teams” responding to immediate needs. This year’s Tiger Teams were recently selected after extensive polling of air quality managers and external review. Detailed descriptions of all current AQAST projects and air quality partners are posted on the AQAST Web site at http://aqast.org. The site also provides information on publications, presentations, tutorials, meetings, and other activities by AQAST members. News and public resources related to AQAST may be found at http://aqast-media.org.

AQAST can already chalk up many important successes. For example, it provided North American background ozone estimates for the U.S. Environmental Protection Agency’s (EPA) Integrated Science Assessment (ISA) toward revision of the ozone National Ambient Air Quality Standard (NAAQS). It partnered with the U.S. National Park Service to quantify and attribute nitrogen deposition to national parks. It developed a user-friendly tool (GLIMPSE) to quantify the climate applications of different air quality management options. On a local level, AQAST provided nowcast support to track and characterize the plume from a major landfill fire in Iowa in 2012, it analyzed the air quality implications of the forest fires in Colorado in 2012, and it supported the first designation of an exceptional ozone event in Wyoming as due to stratospheric influence. All these activities were done in cooperation with state and local agencies. AQAST is also involved in outreach to the public including a network of “ozone gardens” to demonstrate the harmful effects of ozone on vegetation.

AQAST holds twice-yearly meetings in various parts of the country to connect with the air quality management community. These meetings are open to all and air quality managers are particularly encouraged to attend. Our last meeting at Rice University in January 2014 drew more than 100 air quality managers and research/applications partners. At this writing, our next meeting will be at Harvard University in June 2014, and the following one is tentatively scheduled for December 2014 in Atlanta.

We hope that this issue of EM will make you want to learn more about AQAST and how it can help address your air quality management issues. Do not hesitate to contact us! We aim to be of service and look forward to hearing from you.