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DISCOVER-AQ: an innovative approach to study the vertical distribution of air quality constituents in the Earth's atmosphere

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DISCOVER-AQ (Deriving Information on Surface Conditions from Column and Vertically Resolved Observations Relevant to Air Quality) is a multi-year NASA research project to improve remote sensing of air quality from space. Satellite-based measurements of air pollutants typically provide information integrated over the total atmospheric column while it is the lowermost part of the atmosphere that is of interest from a public health perspective. DISCOVER-AQ has implemented a new field observation strategy to collect a comprehensive dataset on the vertical distribution of air pollutants in the atmosphere. In situ measurements from the NASA P-3B Airborne Science Laboratory generate profile information of air quality constituents over a set of selected ground monitoring sites. Ground and profile information is tied to column information collected by active and passive remote sensors looking downward from a second King Air aircraft flying higher in the atmosphere above the P-3B. Vertical profiles of air pollutants are measured repetitively during different times of the day and under different meteorological conditions occurring in the timeframe of 1-month field campaigns. Targeted regions in the U.S. affected by poor air quality include the Washington/Baltimore metropolitan area (June/July 2011), the San Joaquin Valley in California (January/February 2013), the Houston metropolitan area (September 2013) and the Northern Front Range area in Colorado (June/July 2014).

Herein, we will present the DISCOVER-AQ project to the European community and show preliminary analyses of the obtained data. The latter will focus on non-methane hydrocarbons and ammonia, being the species measured by our newly developed airborne PTR-ToF-MS instrument (see session AS4.17). In situ ammonia data collected over the San Joaquin Valley are in promising agreement with satellite data obtained from the Tropospheric Emission Spectrometer (TES).

Web site: http://discover-aq.larc.nasa.gov/

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