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DEVELOPMENT OF IGOR PRO BASED DATA ANALYSIS PROGRAMS FOR USE IN THE STUDY OF ATMOSPHERIC CHEMISTRY

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The Atmospheric Chemistry and Technology (ACT) lab is primarily focused on the study of organic species in suspended particulate matter. The particulate matter contains a large number of organic species, which leads to large, detailed datasets. The datasets are difficult to work with due to their large size and high level of detail. To aid in further study of these particles, several instruments are often used simultaneously for measurement and data collection. While data analysis techniques exist for many atmospheric chemistry instruments, the large size of the datasets can make these methods prohibitively time-consuming. In an effort to reduce this time burden, software programs that rapidly analyze this data are essential. To this effect, programs were developed or improved in Igor Pro (WaveMetrics, Inc., Lake Oswego, Oregon) for several instruments and general functions: the AE-33 Aethalometer (Magee Scientific, Berkeley, California), which allows for the measurement of the absorption of particles, the Scanning Mobility Particle Sizer (SMPS; TSI Inc., Stillwater, Minnesota), which is used to measure the mobility diameter of particles, Thermal Desorption Aerosol Gas Chromatogram (TAG) and Volatility and Particle Separator (VAPS), which separate organic components of particles based on their volatility and/or polarity, and a preexisting Binning Method program that analyzes TAG/VAPS data using positive matrix factorization (PMF), which is a popular source apportionment technique. The above programs offer the user many different tools for data manipulation and visualization for each of the mentioned instruments. Additionally, these tools will prove beneficial to the further study of organic particles and general atmospheric science due to their ability to efficiently work with and provide visualization for the large amount of data generated from these widely used instruments.