

Field Performance Evaluation of the Monitor for AeRosols and GAses in ambient air (MARGA)

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In an effort to supplement its long-standing Clean Air Status and Trends Network (CASTNET) filter pack measurements of weekly integrated atmospheric concentrations of pollutants, the US EPA has evaluated the performance capabilities of duplicate Monitor for AeRosols and GAses (MARGA) systems at the Beltsville, MD (BEL116) site. The MARGA system measures hourly (semi-continuous) ambient concentrations of soluble gases (SO₂, HNO₃, NH₃) and aerosols (SO₄⁻², NO₃⁻, NH₄⁺) which can be used to better characterize atmospheric deposition processes that contribute to ecosystem exposure to nitrogen and sulfur compounds.

MARGA performance has been verified through the US EPA's Environmental Technology Verification (ETV) program and further evaluated in a study detailing modified procedures to correct for any limitations or artifacts.

To date, much of the study devoted to these instruments has been with regard to their capacity and performance in an intensive research environment where meticulous time and attention can be devoted to observation, maintenance, and correction procedures. This communication outlines field implementation of the MARGAs at the BEL116, MD site over 3 seasons of the past year, including collocation of duplicate systems with hourly trace gas measurements (SO₂ and NO_y), and time integrated sampling methods historically present at CASTNET sites (e.g. filterpack, AMoN samplers). This will provide better insight as to the contribution of episodic pollution events from both local and regional sources and diurnal variations have on the integrated measurements as well as identify any unknown biases or sampling artifacts associated with the existing methods. The measured ambient concentration data will also be compared with historical CMAQ predicted concentration values as a function of season and time as a tool to investigate the efficacy of the model and potentially identify any artifacts or biases, particularly autocorrelation of deposition velocities and concentrations that may exist.

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