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FIELD EVALUATION OF A LAMINAR-FLOW, WATER-BASED CONDENSATION PARTICLE COUNTER SUSANNE V. HERING, Aerosol Dynamics Inc., Olga Hogrefe, G.Garland Lala and Kenneth L. Demerjian, ASRC, University at Albany.

A newly developed, laminar flow, water-based condensation particle counter (WCPC) was evaluated under field conditions during a three-week field campaign in New York City. The WCPC utilizes a "growth tube" technology that enables the enlargement of particles by water condensation in a laminar, thermally diffusive flow. The instrument tested, the Quant-400, is the prototype of the commercial version (TSI-3785). It operates at a sample flow of 1 L/min and is not sheathed. Saturator and condenser temperatures were set at 20 C and 60 C, respectively.

Field measurements were made at Queens College, in January 2004, as part of the New York Supersite Study. Total ambient particle number concentrations were compared to a collocated butanol-based condensation particle counter (TSI-3022). On one day, the WCPC was placed downstream of a nano-differential mobility analyzer, with collocated measurements with an ultrafine condensation particle counter, the TSI-3025.

The WCPC agreed to within 2% on average of the TSI-3022 when concentration data are derived from single particle counting. Pooled standard deviation for five-minute averaged data was 4%. Agreement was not as good, nor as consistent, at ambient concentrations above 65,000cm^{-3} , when the WCPC values were derived from total scattering from the "cloud" of particles. When placed downstream of the nano-differential mobility analyzer, the WCPC concentrations were generally within the statistical error of those reported by the TSI-3025 over the entire size range from 5 nm to 100 nm.