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**IN-CABIN COMMUTER EXPOSURE TO ULTRAFINE AND NANOPARTICLES IN LOS ANGELES ROADS AND FREEWAYS: MEASUREMENTS WITH A NEW WATER-BASED CONDENSATION PARTICLE COUNTER.** ANTONIO H. MIGUEL, Arantzazu Eiguren-Fernandez and Yifang Zhu, Southern California Environmental Health Sciences Center and Southern California Particle Center and Supersite, Institute of the Environment, University of California, Los Angeles, CA.

High concentrations of ultrafine (UF, dp<100nm) and nanoparticles (NPs, dp<50nm) have been observed on or near freeways in urban areas by a number of investigators. A component of fine particles (PM2.5 ), UF particles are toxic to lab animals and are able to enter the circulatory system when inhaled. Thus, it is reasonable to expect that, as a result of increasing traffic congestions and commute times occurring worldwide, in-cabin exposure may constitute the most important route of exposure to toxic PM. Despite these findings, limited in-cabin information is available for human exposure to PM while traveling on congested freeways, or walking on sidewalks of city streets with high volume of traffic. We report the first set of in-cabin observations of particle number concentration (#/cm3) acquired with an all new water-based condensation particle counter (WCPC) while driving in Los Angeles roads and freeways. A TSI Inc. model 3785 WCPC, sensitive to fast-changing aerosol concentrations ranging from ca 10 nm to over 3 μm in diameter, was used to test two vehicles in this study: A model 2002 1.8T Jetta Wagon and a model 2004 Audi A4 1.8T passenger car, each equipped with a factory-installed high efficiency particulate matter filter (HEPA) followed by a bed of activated carbon. The driver and a passenger drove in typical high-traffic Los Angeles freeways and roadways, with varying fractions of heavy duty diesels vehicles, under a variety of in-cabin test vehicle parameters and operating conditions including open or closed windows, engagement of the vehicle air conditioning system and intake air, vehicle speed, and traffic conditions. In-cabin carbon monoxide (CO) concentrations were measured at one-minute intervals on a continuous basis by a TSI Model 8550 Q-Trak monitor. Our results show that, in general, while driving on freeways and surface streets, carbon monoxide (CO) concentration and particle number concentration went up and down together. Relatively low CO concentrations with high particle number concentrations were observed on freeways with free flow traffic. Dramatic increase in particle number concentration occurred when the vehicle went from local streets onto freeways. The highest on-board cabin particle number concentration, about 3.0e5 particle/cm3, was observed while driving on the I-710 (a major truck route with up to 25% heavy-duty diesels) and I-105 freeway with all windows open when traffic was moving at ~65 mph. The lowest particle number concentration, ~2,000 particle/cm3, was observed while the vehicle was at a shopping center's parking lot with the engine off and windows closed. The factory installed standard HEPA filter offers good protection against PM. Differences between observed highest and lowest particle number concentrations in this study were ca 130 times.

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