

## **Total Particulate Matter From Mobile Sources in Los Angeles**

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While progress has been made in quantifying primary particulate matter (PM) emissions from combustion sources, fewer studies have characterized the secondary PM formed from the emissions from these sources, and fewer (if any) experimental studies have holistically examined the link between tailpipe emissions from mobile sources and ambient PM. In this study dilution and smog chamber experiments were performed to characterize the primary emissions and secondary organic aerosol (SOA) formation from gasoline and diesel vehicles and gasoline small off-road engines (SOREs). We then calculated the total PM (primary+secondary) contribution of these mobile sources to ambient PM in L.A. by combining primary emission, SOA production and fuel consumption data.

Substantial SOA formed during every experiment with 15 gasoline vehicles. The emissions from some vehicles generated as much as five times the amount of SOA as primary PM, suggesting that ambient PM from gasoline vehicles is likely dominated by SOA. Tests with two heavy-duty diesel vehicles (HDDVs) equipped with catalyzed diesel particulate filters (DPFs) produced negligible primary PM and SOA. Therefore, catalyzed DPFs appear to be very effective in reducing both primary PM and SOA formation from HDDV exhaust. A HDDV without a DPF emitted large amounts of primary PM but generated relatively small amount of SOA—comparable with the newest gasoline vehicles. Therefore, the ambient PM contribution of HDDVs without aftertreatment is likely dominated by primary PM emissions. Gasoline SOREs emit extremely high levels of primary PM, and their emissions also generate many times more SOA per kg of fuel than any of the other mobile sources. However, the vastly greater fuel consumption of on-road vehicles renders them (on-road vehicles) the principal mobile source of ambient PM in the Los Angeles area.