

The Impact of COVID-19 Travel Restrictions on Phoenix Air Quality

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About the Speaker

Dr. Matt Fraser is Professor in the School of Sustainable Engineering and the Built Environment at ASU. His research expertise revolves around air pollution measurement and analysis, atmospheric chemical transformations, air pollution instrumentation and the environmental impacts associated with energy generation. Prof. Fraser currently serves as Associate Director for the School of Sustainable Engineering and the Built Environment as well as co-Director for ASU's Healthy Urban Environments Initiative which is developing, demonstrating and deploying solutions to mitigate urban heat and air quality in Maricopa County.

About the Talk

During the travel restrictions in response to COVID-19, the popular press was full of news stories about lower air pollution concentrations from less driving. In Phoenix, the Stay-At-Home order coincided with the seasonal transition from winter (less solar heating resulting in poor vertical mixing) to summer (more solar heating results in better vertical mixing) when concentrations of directly emitted pollutants usually start to decrease. Since pollutant concentrations are governed by both emissions as well as dilution and mixing, we analyzed local air pollutant concentration values as well as vertical mixing to separate out the impact of lower emissions due to less vehicle traffic compared to dilution due to increased vertical mixing. Our study showed that tailpipe emissions did not decrease during the COVID-19 Stay-At-Home order but that entrainment of road-dusts did decrease during this same period. This conclusion is consistent with elevated tailpipe emissions of pollutants like carbon monoxide (CO) during vehicle cold-start, where catalytic converters are not at operating temperatures. However, entrainment of road-dusts is based solely on vehicle-miles-travelled and is independent of cold-start operation. Thus, the air quality data suggest that while overall vehicle-miles-traveled did decrease during the COVID Stay-At-Home orders, there were just as many vehicle trips albeit of shorter duration.

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