

Commerce City, Colorado, The Dirtiest Zip Code in The United States?!

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Abstract

Primary and secondary air pollutants were monitored over an entire year in Commerce City, a mixed industrial-residential suburb north of Denver, Colorado, during 2022-2023. The monitoring station was less than 1 km north of Suncor's Commerce City refinery, which is the largest refinery in Colorado. The refinery and associated petroleum processing operations are located within an urban area that has been labeled as the most polluted zip code in the nation. This mixed industrial and residential neighborhood is home to mostly Hispanic minority communities. Monitoring data for a wide suite of air pollutants, i.e. ozone, carbon monoxide, nitrogen oxides, sulfur dioxide, hydrogen sulfide, methane, volatile organic compounds, particulate matter, and airborne radioactivity, were provided in real time to a website to inform the public about their local air quality. Concurrent measurements at other Colorado Front Range locations provide comparison for deciphering the burden from local pollution sources versus regional influences and pollution transport. The Commerce City monitoring data show a highly dynamic behavior, with frequent short duration, extreme concentration increases of gaseous and particulate air pollutants, reaching up to 1000 times background levels. A much higher number of highly increased pollution events was observed than at the comparison sites. During most times, numerous pollutants were present at elevated levels at the same time. Wind and transport analyses point to multiple industries and particular operations as emission sources. Exposure to rapidly changing pollutant concentrations and cumulative pollutant health effects from the exposure to multiple gas and particulate pollutants as observed in this study are currently not considered in regulatory air quality standards, which questions the adequacy of the regulatory framework for protecting the health of communities in this type of mixed residential-industrial setting.

Early Career Scientist

NO, I am not an early career scientist.

IGAC Activities

MAP-AQ: Monitoring, Analysis and Prediction of Air Quality