Environmental Justice Research Update

DECEMBER 13, 2019





Disadvantaged Communities

CalEPA designates the highest scoring 25% (75th percentile) of census tracts from CalEnviroScreen (CES) 3.0 as disadvantaged communities.



Outline

- We have made encouraging progress
- Exposure and health disparities still exist
- We are learning more about the sources of the disparities

Reduced vehicular emission rates



- Fleet-average emission rates of hydrocarbon (HC) and nitric oxide (NO) have decreased.
- The disparity between low- and high-socioeconomic status has been narrowed as well.

Zhan et al. CRC Real-World Emissions Workshop, 2019

I-710 communities have elevated cancer risk due to vehicular diesel PM emissions...





Most of the communities near the I-710 study area are disadvantaged

...but the estimated cancer risk from vehicular diesel PM from the I-710 has been reduced



Thanks to the **Diesel Risk Reduction Plan**, estimated cancer risk due to diesel PM from the I-710 has been reduced by 83% from 2009 to 2016

However, disparities still exist

For instance, much of the worst PM_{2.5} pollution is located in the **San Joaquin Valley** and the **South Coast** air basins



Lee, Environ. Sci. Technol. 2019, 53, 12774-12783

Who is more likely to live with poor air quality?



What sources are contributing to this disparity?



What sources are contributing to this disparity?

- Mobile sources
- Stationary sources
- Emerging issues

More highway vehicle traffic in disadvantaged communities





PM_{2.5} exposure from on-road mobile sources can be higher for people of color



On-Road Mobile Sources



PM_{2.5} exposure from off-road mobile sources can be higher for people of color



Off-Road Mobile Sources



Disadvantaged communities have more industrial sources





PM_{2.5} exposure from industrial sources can be higher for people of color



Contract

PM_{2.5} exposure from natural gas and petroleum sources can be higher for people of color

Natural Gas and Petroleum



Stationary

Contract

Duren et al., *Nature* 2019, 575, 180–184

Methane

Methane hotspots

- Methane itself is non-toxic, but can be typically co-emitted with toxic pollutants and odors depending on the source (i.e., benzene from oil and gas)
- Methane sources are prevalent in communities with high CalEnviroScreen scores
- These sources may produce odors and other emissions – follow up work planned







Air pollution from Mexico can reach CA border communities



• Several CA communities close to the Mexican border are disadvantaged • Red areas are census tracts in the 75th percentile of CES

scores

Contract

Air pollution from Mexico can reach CA border communities





- Red dots are emissions sources in Mexico (Mexicali)
- The yellower plume colors indicate a larger impact on local concentrations

Source: Penelope J.E. Quintana, SDSU

Conclusions

- Disadvantaged communities often have more sources of air pollution, including mobile and stationary.
- Staff continue to analyze the emissions and health impacts from these sources.
 - In progress: air monitoring in AB 617 communities.
- Identifying sources of air quality disparities can inform the selection of AB 617 communities, opportunities for targeting incentive programs, and in focusing rules/regulations.