

QUANTITATIVE COMMUNITY GEOGRAPHY: A PRELIMINARY EVALUATION OF NITROGEN DIOXIDE LEVELS AND POSSIBLE SOLUTIONS TO EXPOSURE RATES IN NPU-V, ATLANTA, GA

The community of NPU-V in Atlanta, GA is one of the most vulnerable and disenfranchised populations in the area. The region is bisected by two major interstates and a rail line hub which were constructed back in the 1950's during a racially-charged political and economic change. Nitrogen dioxide is a precursor to hazardous ozone and comes from combustion of fossil fuel, natural gas and even tobacco smoke. Knowing the sources of nitrogen dioxide, it raises the question how is the community being impacted? Georgia State University partnered with ECO-Action, a grassroots organization in the heart of NPU-V and a voice for the people of the community. 26 sites were selected across neighborhoods where passive air monitors (Ogawa) were placed. 8 of these sites were selected by Eco-Action to address specific air quality concerns.

UV-vis absorbance was used to determine how much NO₂ the monitors were exposed to over a 7-day exposure period. Nitrite solutions were used to calibrate the instrument. Sample points and concentrations were plotted with ArcGIS. Geospatial analysis showed a relationship between higher nitrogen dioxide concentrations and proximity to highways ranging from 6 to 21 ppb. No samples exceeded the EPA's standard at 53 ppb. Nevertheless, even low exposure can irritate the eyes, nose, and lead to lung fluid buildup.

Possible solutions were explored, including local effects of highways and vegetative barriers. Mann-Whitney U tests proved a statistical significance distinguishing concentrations ≤ 400 meters and concentrations ≥ 400 meters. Concentrations closer to the highway proved to be higher, $U=15.00$, $P=0.002$. A Mann-Whitney U test proved no statistical significance distinguishing the presence of vegetative barriers versus no vegetative barrier, $U=4.00$, $P=0.827$. With this preliminary assessment, we have brought some of the concerns of the people to light and suggest more research be done to provide solid statistical evidence that is available for the pursuit of environmental justice and addressing long standing historical issues.