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Sustainability Futures: Challenges and Opportunities Towards a More Sustainable World

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Ambient air quality within urban communities of South Africa

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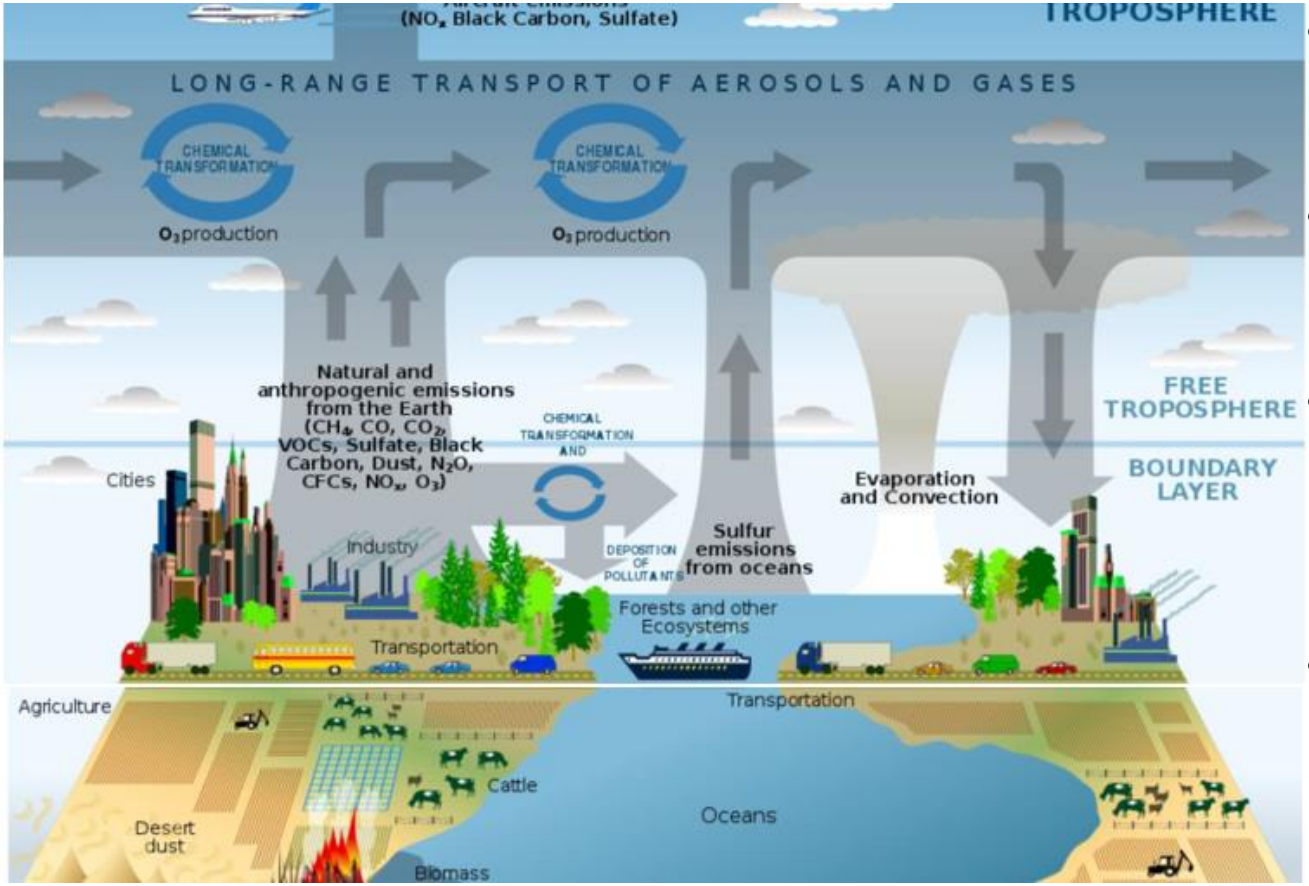
STUDY BACKGROUND



- Air pollution is one of the greatest environmental challenges facing the world today.
- Air pollution became the 4th leading cause of premature death globally in 2019 (Health Effects Institute, 2020).
- The Lancet Commission on air estimated that 92 % of air-related premature deaths happen in low-income developing countries (Landrigan et al., 2018).
- An estimated 90 % of the world population is being exposed to $PM_{2.5}$ above WHO thresholds (HEI, 2020).

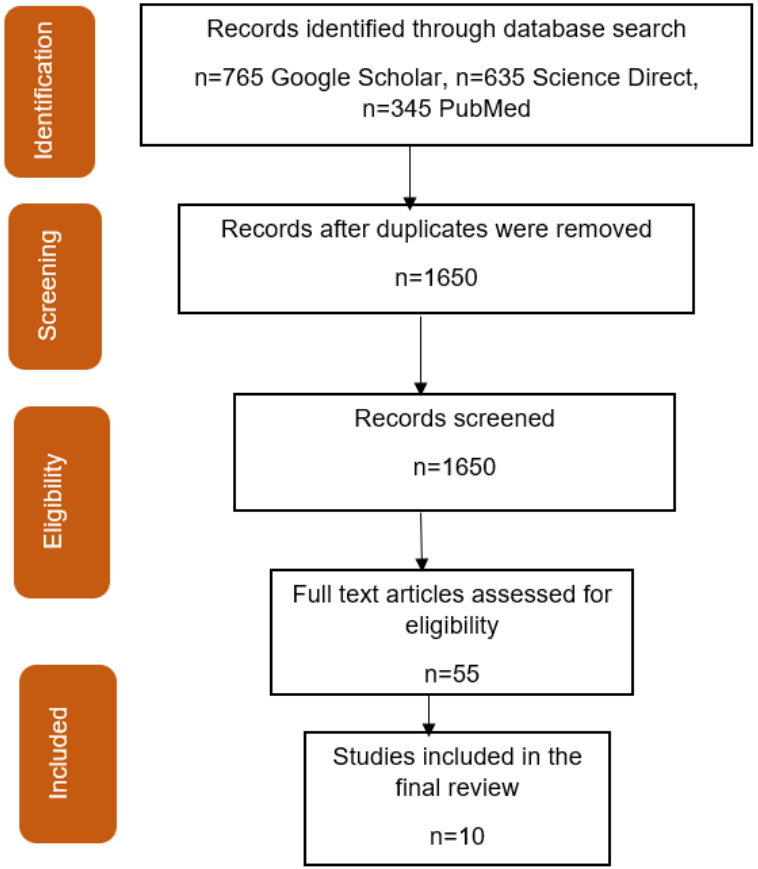
OBJECTIVES OF THE PAPER

- Evaluate air quality studies done in urban communities of South Africa.

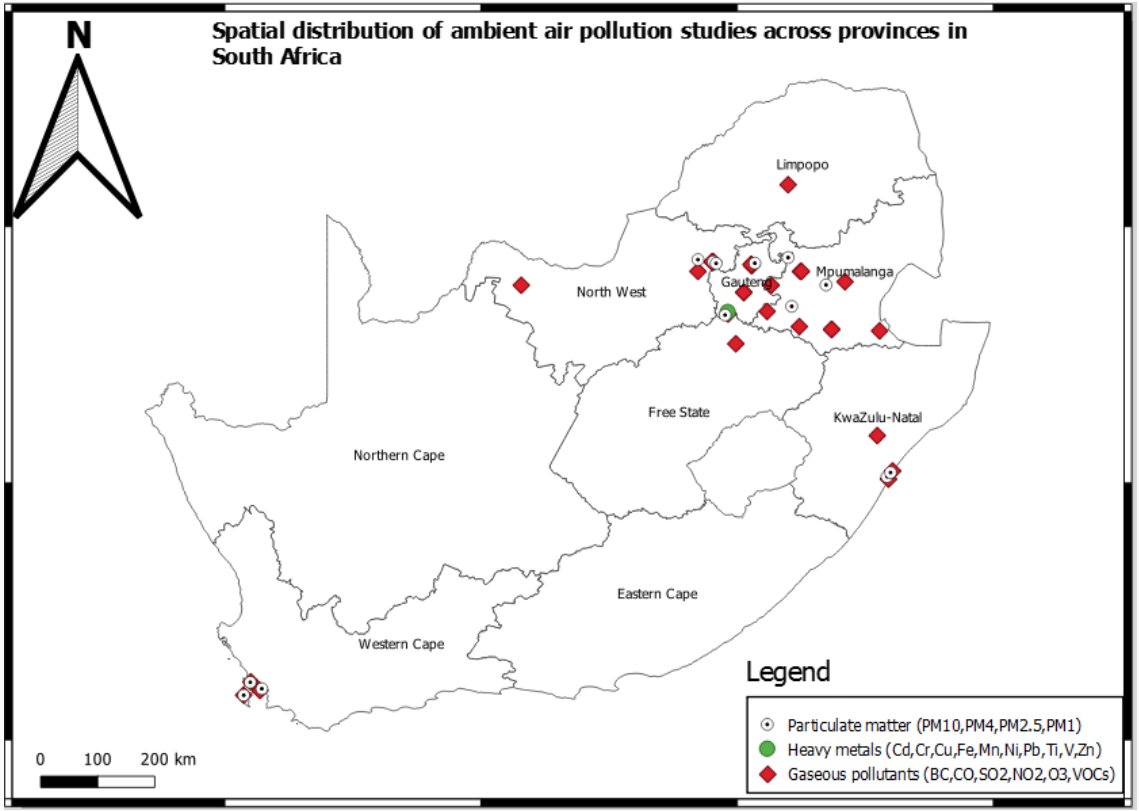
APPROACH USED

- The study adopted a systematic review format where an internet search was conducted for relevant studies that focused on ambient air quality in South Africa.
- Search and screening focused on English Articles stored in online English databases such as Google Scholar, Science Direct and PubMed.
- Key search phrases included ambient air quality, air quality, PM_{10} studies, $PM_{2.5}$ studies and aerosols.

APPROACH USED



KEY RESULTS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Spatial distribution of ambient air pollution studies across provinces in South Africa
Limpopo
North West
Gauteng
Mpumalanga
Free State
KwaZulu-Natal
Northern Cape
Eastern Cape
Western Cape
0 100 200 km
Legend
Particulate matter (PM10,PM4,PM2.5,PM1)
Heavy metals (Cd,Cr,Cu,Fe,Mn,Ni,Pb,Ti,V,Zn)
Gaseous pollutants (BC,CO,SO2,NO2,O3,VOCs)

MAIN CONCLUSIONS

- Elevated ambient concentration levels were observed in the morning from 6.00 am to 09.00 am as well as from 5.00 pm to 10.00 pm (Hersey *et al*.,2015).
- Annual levels of different criteria pollutants were as follows; NO_2 (39.442 µg/m^3) SO_2 (22.464 µg/m^3), CO (722.003 µg/m^3).
- 8-hour concentration was CO (649.902 µg/m^3) and O_3 (33.556 µg/m^3) and did not exceed the South African ambient National Air Quality Standards (Morakinyo *et al*., 2020)
- Positive association was established between population growth and black carbon, carbon monoxide and sulphur dioxide in urban communities of Pretoria, Rustenburg and Emalahleni (Shikwambana and Tsoeleng 2020)

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