

INFLUENCE OF LAND AND OCCUPATION ON AEROSOL CHEMICAL COMPOSITION IN THE EASTERN OF SÃO PAULO CITY

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Introduction

Air pollution is one of the main environmental problems in large urban centers, harming people's health and impacting the quality of life. The city of São Paulo presents frequent exceedances of air quality standards, modulated by meteorological conditions and the main sources of pollutant emissions. Because of the high number of sources and different compositions of fine particulate matter (PM_{2.5}), together with their effects on climate and human health, the analysis of aerosol concentrations in the urban atmosphere is becoming increasingly important. Thus, it is necessary to analyze and identify the main trace elements of PM_{2.5} on days of high concentration of pollutants, identify the main sources and their relationship to land use and occupation.

Data and method

→ Database

- ✓ Period of study: 2015;
- ✓ Selection of 10 CETESB monitoring stations and 1 manual monitoring station located in the East Zone of São Paulo (EACH Campus);
- ✓ Daily data exceedances (WHO standard);
- ✓ Pollutants: PM₁₀ and PM_{2.5};
- ✓ Complementary techniques: gravimetry, energy dispersive X-ray fluorescence (EDXRF) and ion chromatography;
- ✓ Meteorological variables: Wind Speed (WS) and Wind Direction (WD) collected at Guarulhos International Airport.

→ Selection criteria for exceedance events:

- ✓ PM₁₀: exceeded WHO standard for at least 5 consecutive days in 5 monitoring stations or more
- ✓ 2 episodes were selected: 17 days of high concentration of PM₁₀ and PM_{2.5}.

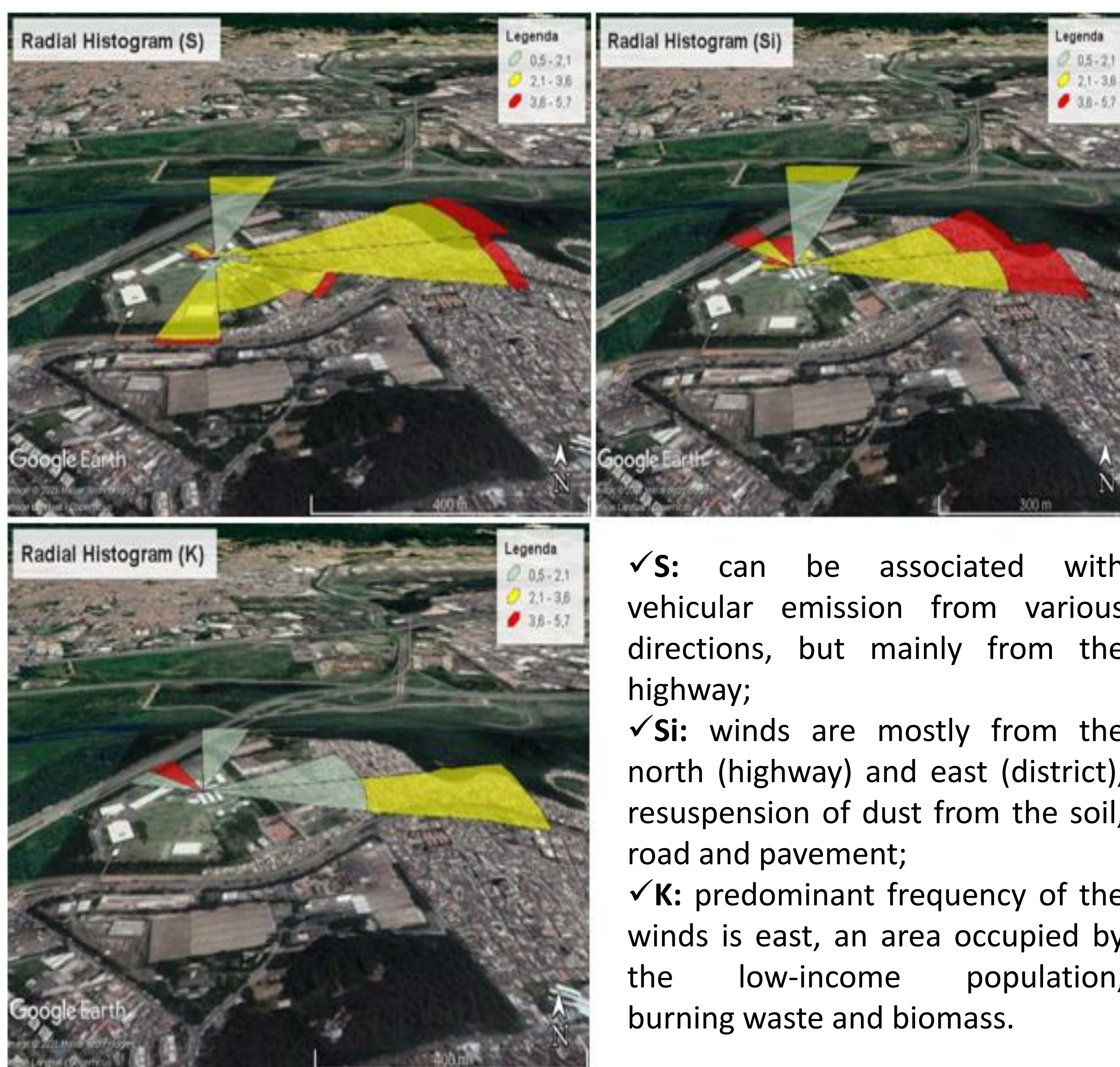
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Results and discussion

17 days of high PM concentrations were identified between July and September, the austral winter months. The concentrations showed a higher percentage of three main chemical elements, namely: Sulfur, Silicon, and Potassium.

Figure 1: Radial Histogram with the percent frequency of wind direction (WD) and wind speed (WS) for sulfur (S), Silicon (Si) and Potassium (K), with the sampling point location at USP/EACH (23°48'S, 46°49'W).



- ✓ **S:** can be associated with vehicular emission from various directions, but mainly from the highway;
- ✓ **Si:** winds are mostly from the north (highway) and east (district), resuspension of dust from the soil, road and pavement;
- ✓ **K:** predominant frequency of the winds is east, an area occupied by the low-income population, burning waste and biomass.

- ✓ The predominant ion at 17 days was sulfate (SO₄⁻²), which can be associated with the influence of vehicle emissions;
- ✓ Other chemical elements were also identified on days of high concentration, such as lead (Pb), but their concentration was considered below air quality standards in both Europe and the USA and below the annual lead standards (0.5µg/m³) suggested by the São Paulo Environmental Company. The lead identified can be associated with vehicular emissions and also the international airport, as the wind direction indicates the origin of aircraft influence as well as previous studies, report the use of Pb in fuels used in small aircraft