Investigation of soil pollution sources in the El Paso region using SEM, magnetic susceptibility, and XRF analysis

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In urban area soil pollution is a major concern for the health of residents, development of the land, water usage, and agricultural production. This makes investigation of soils important for maintaining the well-being of people, plants, and animals that reside within the area of study and beyond. In this study, we will investigate soil pollution using three methods: magnetic susceptibility, scanning electron magnification, and x-ray fractionation. Potential sources of pollution in El Paso region include a former artillery range, oil refineries, smelters, power plants, freeways, and other dismantled industry.

Magnetic susceptibility is a quick, easy method to detect pollution in soils involving simple sample preparation and provides rapid, repeatable analyses. The iron oxides generated through combustion display high magnetic properties which act as a proxy for heavy metal pollution from the source. The Scanning Electron Microscope (SEM) allows for up to 10,000x magnification of samples and also has an X-ray attachment that allows for elemental analyses of specific sample grains. The X-ray Fractionation instrument available at NMSU will provide us with detailed analyses of trace elements within soil samples. After collection of samples and analysis of data, we hope to better understand processes involved in heavy metal pollution of sample area soils and identify point sources of the pollutants.

Keywords:
environmental geology, pollution, soils, SEM, magnetic susceptibility studies, XRF studies

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