

Regional Soil Pb Analysis Guidelines

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1 Introduction

Developing methods to analyze hazards, such as contaminated soils and waters requires adherence to strict field, laboratory, and documentation protocols for three reasons.

First, as environmental scientists, our aim is to collect valid data. In the cases of analytic chemistry, generating spurious data because of flawed methods is not only frustrating, but can lead to the wrong conclusion.

Second, in the case of contaminants, there may be legal implications, thus, if the hope to that the data might be used to make a legal case – following reliable and tested methods is key.

Finally, our stakeholders deserve the best. Regional or local residents invest (even emotionally) on the results of scientific studies. When the methods are not well develop, implemented or poorly documents, the study can re-enforce injustices.

1.1 Background

Heavy metals in soils are a well known issue...

Lead Resources and Soils:

<https://www.atsdr.cdc.gov/csem/csem.asp?csem=7&po=8>

(look under soil heading)

2 Practices Sessions

Session 1 : Tutorial on Field Methods and Random Sampling

gis: Mapping Park Data –

<https://goo.gl/hwBZQm>

Session 2 : Soil Sampling – SOP31

Session 3 : Pb Extraction SOP35, pH SOP33, texture SOP32

Session 4 : ICP-MS Analysis SOP70

Session 5 : Literature Review

Session 6 : Expert Teams

Each student will conduct research on a topic and present to the class. Each presentation should be less than 12 minutes and include a short one page summary that is hand to the students as a resource.

Industrial Sources Where does Pb come from? What are the ores? How are the ores processed to obtain purified Pb? What are the environmental costs for Pb mining? How have these environmental impacts changed?

Use in Industry (except gasoline) How is Pb used in various industrial processes and products? Why has Pb been used in paint? solder? electronics? What are the forms (oxidation states) are common in industry?

“Ethyl” gas and airplane fuels What was Pb used in combustion engines? Are their substitutes? When and how was this changed?

Atmospheric transport and deposition Why is Pb transported in the atmosphere? In what forms? How is it deposited (rain or dry deposition)? What are the impacts of Pb in the air?

Aquatic fate & transport How is Pb introduced to aquatic systems? What is its fate? How does water become hazardous to humans and other taxa? How does water get into municipal water supplies? What concentrations are considered hazardous?

Sinks Where is the fate of anthropogenic Pb? Are soils or sediments more important? What controls their absorption-desorption process? changes in pH? redox? Can they remain bioavailable? Under what circumstances?

Food web dynamics How does Pb accumulate in biota? Are there Pb accumulators?

Toxicity (non-human) What is the toxicity of lead to non-humans? What is the LD₅₀? How does the toxicity vary with environmental conditions? Are some taxa more sensitive than others? What is the mode of action for toxicity?

Human health effects (physiological, toxicity)

Public health effects (crime, IQ, etc)

Session 7 : Data Analysis (Results)

<http://claremont.maps.arcgis.com/apps/GeoForm/viewer.html?appid=31f6fe27f5ef464bb6f58aa5a03baeab>

Session 8 : Final Report

	Student	Presentation.Date	Topic
1	Caroline	10/10/2017	Use in Industry (except gasoline)
2	Meily	10/10/2017	Ethyl gas and airplane fuels
3	Troy	10/10/2017	Atmospheric transport & deposition
4	Sarah	10/10/2017	Aquatic fate & transport
5	Kihara	10/10/2017	Sinks
6	Kyle	10/10/2017	Food web dynamics
7	Brooke	10/17/2017	Toxicity (non-human)
8	Bebe	10/17/2017	Human health effects (physiological, toxicity)
9	Mina	10/17/2017	Public health effects (crime, IQ, etc)
10	Chris	10/17/2017	Los Angeles Pb History
11	Katherine	10/17/2017	California Pb Regulatory History