concordance=TRUE

Annotated Bibliography

EA30 – Spring 2017

April 19, 2017

1 Abstract

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2 Instructions

Please complete the annotated bibliography by the 17th of April.

2.1 Searching for Academic Sources

There are numerous electronic sources to evaluate and obtain academic sources of information. Usually, we consider peer reviewed articles to have the highest quality scholarship. As a rule of thumb, this is a good start, but there is also a great deal of variation between sources, even journal titles can vary in quality. Thus, it's best to evaluate a range of sources and appreciate the subtle differences in quality and prestige.

First, you should search CUC databases using key words, such as Pb and lead. I admit the lead is tricky, because it's not a useful term due it a double meaning. I suggest heavy metals or trace metals with the other key words, i.e. fate and transport, toxicity, etc, depending on the topic you selected.

Below are links to some useful databases:

- Web of Science
- JStore
- Google Scholar

2.2 Writing an Annotated Bibliography

After adding your citation to the Pb_literature.bib, using the BibTeX format, cite your reference using the syntax below. Then, write a concise annotation that summarizes the central theme and scope of the book or article. Include one or more sentences that (a) evaluate the authority or background of the author, (b) comment on the intended audience, (c) compare or contrast this work with another you have cited, or (d) explain how this work illuminates your bibliography topic.

2.3 Implementing in LaTeX

LaTeXis a software program used for desktop publishing. With an eye for detail, the program was developed to give the author a great deal of control. In contrast, Microsoft Word is designed to have lots of options, but these seem to get in the way of controlling the outcome.

LaTeXis an open source program and relies on specific formatting commands that begin with a backslash. For example to start a new section heading, we use `\section{section name}` and `\subsection{subsection name}` to create a subsection heading.

Below might be an example of what we are trying to accomplish using our Rstudio resources. The LaTeXcommand for the citation is `\bibentry{key}`, where key is identifies the citation based on the BibTeX citation entry as shown below.

However, we also need to add the citation to the *.bib file, in this case the file is called "Pb_literature.bib". Open the file. You can see each entry within the curly brackets. Also, it starts with the definition of the entry, e.g. article, book, conference proceedings. We can easily add the citation using the databases cited above. All you need to do is search for the citation manager or citation tool and select a citation format "bibtex". Copy and paste the bibtex format (try to put it in the correct location, i.e. alphabetic order). Note the "key" is the first word after the citation definition.

2.4 Annotated Example

To help the readers, you might create subsection and even subsubsections, using `\subsection{subsection name}` and `\subsubsection{subsubsection name}`.

3 Industrial Sources (Khalil)

4 Use in Industry (except gasoline) (Claudia)

5 "Ethyl" gas and airplane fuels (Viraj)

This study by Galzigna et al. is published in the British Journal of Industrial Medicine. The paper speaks to the negative health effects that result from exposure to tetraethyl lead. The effects of tetraethyl lead are similar to general lead exposure. The primary negative health effect observed was reduced neuromuscular function.

The American Oil and Gas Historical Society offers official history of energy fuels for increasing public knowledge. Tetraethyl Lead was added to gasoline to prevent a common problem in engines before the 1930s called engine knock. Engine knock occurs when the air-fuel mixture in a cylinder about the piston prematurely detonates before the piston has risen to the maximum height. This premature detonation occurs because of the gasoline not being able to withstand the pressure. In the ideal internal combustion engine operation, the air-fuel mixture should only combust because of a spark created by the spark plug, not an increase in pressure. A gass ability to withstand pressure is defined by its octane rating. Adding tetraethyl lead to gasoline increase the octane rating, makes the fuel more resistant to combusting under pressure, and therefore prevents engine knock. In 1921, General Motors scientists discovered the anti-knock properties of tetraethyl lead. Three years later, the first signs that leaded gasolines contributed to lead poisoning occurred when workers at a gasoline treatment plant fell ill. In 1925, after minimal non-comprehensive studies, the U.S Surgeon General stated that there is no reason to prohibit the sale of leaded gasoline. The leaded gasoline industry used many manipulative techniques to hide the fact that lead was present in gasoline. They labelled the higher octane fuel ethyl gasoline, to avoid lead in the name. The word lead was never used in any advertisements for the fuel. Ultimately, in the late 1970s lead was phased out of gasoline and in 1986 a total ban was placed on leaded automobile gasoline. The invention of the catalytic converter in 1975, which required unleaded fuel, also accelerated the phasing out of lead from gasoline.

6 Atmospheric transport and deposition

7 Lead in water (Olivia)

David C Bellinger. Lead contamination in flintan abject failure to protect public health. *New England Journal of Medicine*, 374(12):1101–1103, 2016 .

This article was published in the New England Journal of Medicine by Dr. David C. Bellinger, a Professor of Neurology at Harvard Medical School and Professor in the Department of Environment Health at Harvard T.H. Chan School of Public Health. He writes about historical and modern lead exposure, particularly through water distribution systems. He then explains the institutional inequalities surrounding Flint's water contamination and the effects on public health.

Yolanda Echegoyen, Edward A Boyle, Jong-Mi Lee, Toshitaka Gamo, Hajime Obata, and Kazuhiro Norisuye. Recent distribution of lead in the indian ocean reflects the impact of regional emissions. *Proceedings of the National Academy of Sciences*, 111(43):15328–15331, 2014 .

This study of northern and central Indian Ocean found high concentrations of Pb in surface waters due to rapid regional industrialization and low concentrations in deep waters. The Antarctic sector of the Indian Ocean shows very low Pb concentrations due to limited anthropogenic emissions, high scavenging rates, and rapid vertical mixing. The article predicts an increasing presence of Pb in the ocean following the continued release of Pb from human activities. The data was collected from 11 stations in the 2009-2010 Japanese GEOTRACES transect through the Indian Ocean. The authors of this study are from either Massachusetts Institute of Technology, The University of Tokyo, and Niigata University.

Charles Gobeil, Robie W Macdonald, John N Smith, and Luc Beaudin. Atlantic water flow pathways revealed by lead contamination in arctic basin sediments. *Science*, 293(5533):1301–1304, 2001 .

This study published by the American Association for the Advancement of Science examines sediment cores collected from the Arctic Ocean and Greenland Sea evidence for evidence of lead. The researchers then used the Pb inventory and its isotopic composition to infer the source of the lead contamination and its pathways related to ocean currents and ice drift. The authors are affilliated with Institut Maurice-Lamontagne, Institute of Ocean Sciences, and Bedford Institute of Oceanography in Canada.

Michael R Schock. Response of lead solubility to dissolved carbonate in drinking water. *Journal (American Water Works Association)*, pages 695–704, 1980 .

Michael Schock works with the United States Environmental Protection Agency and has written extensively on lead corrosion and drinking water contamination. His paper presents a revised model showing the response of theoretical lead solubility curves to changes in dissolved inorganic carbonate concentrate and pH of water at 25 degrees Celsius. The author acknowledges that his model cannot be directly applied to accurately predict concentrations of lead in tap water in many situations because of the complex chemical and physical concentration control mechanisms happening in the water distribution system. However, the model improves upon earlier models that did not take into account hydrocerussite and lead carbonate complexes. The revised model had good correlation with experimental data and can therefore be employed with some confidence to measure lead solubility.

William Stansley, Lee Widjeskog, and Douglas E Roscoe. Lead contamination and mobility in surface water at trap and skeet ranges. *Bulletin of Environmental Contamination and Toxicology*, 49(5):640–647, 1992 .

This paper reports lead contamination at shooting ranges where shots have been deposited in open water or wetland areas and the impacts on a nearby lake. The authors found a significant concentration of filterable lead in the slightly acidic marsh, which suggests that lead could be mobilized at a lower pH. There were elevated lead levels in a water sample collected near a public swimming area adjacent to a parking lot, possibly as a result of parking lot runoff. The report found elevated total lead concentrations in surface water in the shot fall zones at six trap and skeet ranges, but found no lead contamination in water, sediments, or fish from a lake adjacent to the range with the greatest amount of shot deposition. However, no measurements of particle size or organic content were performed, both of which have a strong influence on sediment lead concentrations. The sample size of fish studied for uptake of lead was also small. This study was conducted by three researchers from the New Jersey Divsion of Fish, Game and Wildlife.

Herbert L Windom, Ralph G Smith, and Masaru Maeda. The geochemistry of lead in rivers, estuaries and the continental shelf of the southeastern united states. *Marine Chemistry*, 17(1):43–56, 1985 .

This study was conducted in order to establish baseline levels of lead in coastal and estuarine waters of the southeastern United States and evaluate the relative importance of inputs from rivers, the atmosphere, and oceanic exchange. It was published in 1985 by a researcher from the Skidaway Institute of Oceanography and a researcher from Tokyo Universit of Fisheries.

Jingfeng Wu and Edward A Boyle. Lead in the western north atlantic ocean: completed response to leaded gasoline phaseout. *Geochimica et Cosmochimica Acta*, 61(15):3279–3283, 1997 .

This article investigates the significant decrease of lead concentrations in the western North Atlantic Ocean over a 16-year period from the 1980s to the 1990s. The authors attribute the rapid decline in the 1980s to the phasing out of leaded gasoline in the United States. They propose the slower decrease in the 1990s is due to emissions from high-temperature industrial activities rather than residual leaded gasoline emissions. They predict minimal decreases in surface water lead concentrations in coming decades, and continued propogation and evolution of lead distribution in deeper waters. The two authors of this paper are both scientists with the Department of Earth, Atmospheric, and Planetary Sciences at the Massachusetts Institute of Technology.

8 Sinks (Katie)

9 Food web dynamics (Mireya)

10 Toxicity (non-human) (Kelli)

11 Human health effects (physiological, toxicity) (Thea)