How is Mercury Correlated with Dissolved Organic Carbon in Streams?

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Abstract

Levels of dissolved organic carbon and mercury in streams.

Keywords: methylmercury, dissolved organic carbon

1. Introduction

Dissolved organic carbon (DOC) is highly associated with methylmercury production in freshwater ecosystems. The use of optical instruments such as spectrometers in the study of DOC have led to a greater understanding of the chemical characteristics and origin of DOC. State of the art emission excitation matrices analysis have resulted in a greater understanding of DOC and its associations with MeHg in various freshwater systems such as streams. (Graham et al., 2013).

2. Methods

To test these hypotheses, I will sample urban artificial wetlands and wet ponds from sites across Regina and Saskatoon, using methods derived from Strickman and Mitchell (2017). I will then use sediment samples from these sites in mercury methylation assays involving isotope dilution-gas chromatography-inductively coupled plasma mass spectrometry. Samples will be enriched with a stable Hg isotope to determine the Hg methylation rate constants, ambient Hg, and MeHg concentrations.

3. Results

Figure **??** is generated using an R chunk.

```
setwd("~/ldpminiproject/Data")

mercurydata <- read_csv("mercurydata.csv")
```

```
## Rows: 29 Columns: 5
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (2): collection_site, collection_month
## dbl (3): mean_doc, mean_streamwater_mehg, chironomid_mehg
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

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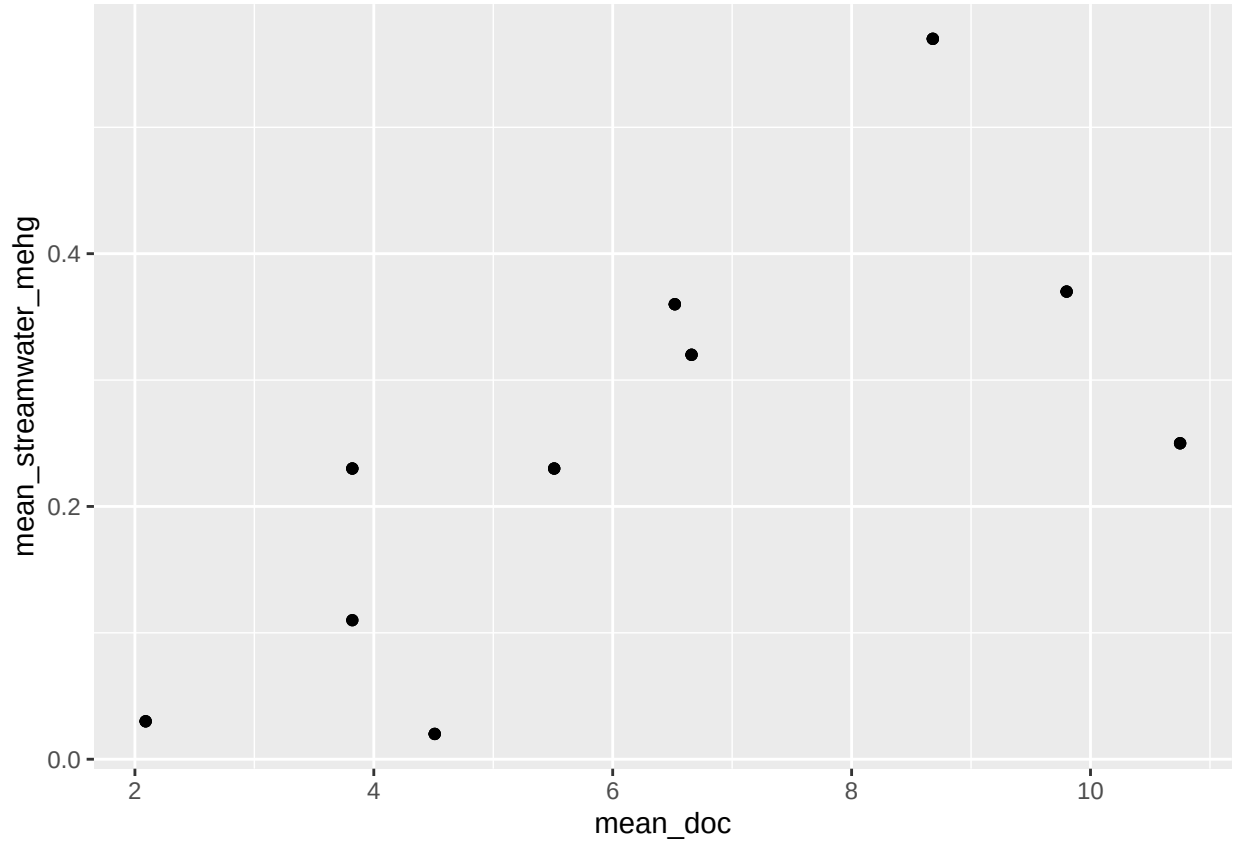
```
mercurydata
```

```
## # A tibble: 29 x 5
##    collection_site collection_month mean_doc mean_streamwater_m~ chironomid_mehg
##    <chr>           <chr>                <dbl>               <dbl>           <dbl>
##  1 Bartlett Brook  May                   3.82                0.23           337.
##  2 Bartlett Brook  June                  3.82                0.23           413.
##  3 Bartlett Brook  July                  3.82                0.23           379.
##  4 Beck Brook      May                   2.09                0.03            83.4
##  5 Beck Brook      June                  2.09                0.03            86.8
##  6 Beck Brook      July                  2.09                0.03           137.
##  7 Blodgett North  May                   8.68                0.57           378.
##  8 Blodgett North  June                  8.68                0.57           438.
##  9 Blodgett North  July                  8.68                0.57           364.
## 10 Blodgett South  May                   3.82                0.11           316.
## # ... with 19 more rows
```

```
ggplot(data = mercurydata,
       mapping = aes(x = mean_doc , y = mean_streamwater_mehg)) +
  geom_point()
```



```
setwd("~/ldpminiproject")
```

4. Discussion

The results may be able to influence landscape planning and facilitate further insight into the relationship between methylmercury and bioavailability of inorganic mercury in urban environments. A great understanding of the interactions in our built environment and how it contributes to human caused ubiquitous ecological disruption (Policy Horizons 2018) can ensure that we, as a society, move towards more sustainable models of development. Benthic invertebrates are commonly used as indicators of stream water quality (Lescord et al., 2018). *Baetis* sp. (Ephemeroptera) are used as stream quality indicators for catchments (Waiser, 2006).

References

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