Analyzing trends in Canadian glacier mass

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Introduction

The data used in this study is taken from http://open.canada.ca/en/open-data[1].

The data set contains 518 measurements of 6 Canadian glacier mass balance, collected from 1960 till 2007. Namely, the file includes these glaciers:

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## [1] "Devon Ice Cap NW - Devon Island, Nunavut"
## [2] "Helm Glacier - southern Coast Mountains (Garibaldi Provincial Park), British Columbia"
## [3] "Meighen Ice Cap - Meighen Island, Nunavut"
## [4] "Peyto Glacier - Rocky Mountain eastern slopes (Banff National Park), Alberta"
## [5] "Place Glacier - southern Coast Mountains, British Columbia"
## [6] "White Glacier - Axel Heiberg Island, Nunavut"
```

Hypothesis

We are interested in finding out whether there is a statistically significant change in mass balance over the observed time period. For these purposes we use **R** (version 3.3.1) and an appropriate statistical test called *t-test*:

$$t = \frac{\overline{x} - \mu_0}{s/\sqrt{n}}$$

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The workflow is as follows:

1. Read the file and run data validation;
2. Run t-test for each glacier and collect p-values;
3. Support the evidence with
    - a table of results;
    - a plot that could help compare different glaciers.

[1] Here is the direct link to data download.