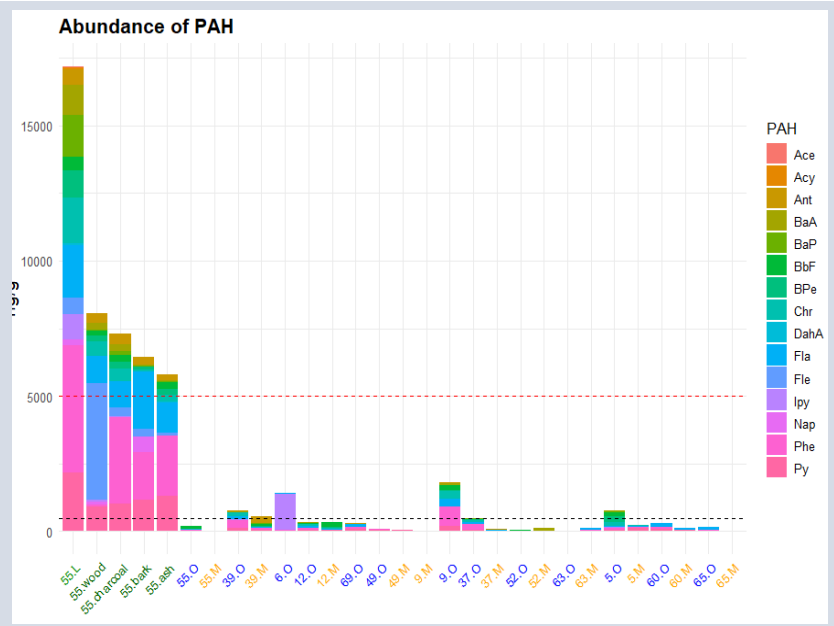


The Impact of Canadian Wildfires on PAH Abundance in various Soil Depths

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Thesis in bullet points:

- Soil samples were analysed for PAH content
- Ratios of various PAH gave insight into fuel and wildfires can be distinguished
- All sites were sampled for organic and mineral horizon, the difference of both horizons was inspected
- Distance between fire and sample site varied and was investigated for its impact
- Age of fire varied between sites and was investigated for its impact on PAH content
- Various fire indices were calculated using satellite data and inquired for correlation with PAH concentration

Methods:

- Biomarker Analysis
- Literature Analysis
- Remote sensing in GIS & Google Earth Engine
- Statistics in R

The content was calculated for the weighed in mass and the concentration statistically analyzed for impact of distance, age, horizon and fire indices.



Results and Conclusion:

The content of PAH was **significantly higher in litter** than in organic or mineral horizon, those did not differ except for the concentration of Phenanthrene (most common PAH). The positive control of a plot which had burnt 2 weeks prior to testing also showed that the **impact of a wildfire on PAH concentration is short-term** and mostly seen in the litter as **organic and mineral horizon did not show an impact** and resembled the samples which had burnt > 15 years ago. The sum of measured **PAHs was significantly higher for recent fires** than for fires older than 5 years, leading to more insight when and how long areas should be closed off for future inhabitants or workers. This finding was supported by several individual PAHs measurements that were elevated in recent samples. The trend was especially visible when comparing the oldest and the youngest category but was not supported when the individual horizons were compared in regard to time. When only looking at organic and mineral horizon, **distance did not have any significant impact on PAH concentration**. **The majority of PAHs were HMW PAHs, indicating a pyrogenic source** but other diagnostic ratios indicated mixed sources. Despite the site being in forested, less populated areas petroleum combustion played an important part as well. A **correlation of fire indices (FRP, dNVDI, dNBR) to PAH accumulation was not found**.