Methane oxidation in landfill cover soils to mitigate greenhouse gas emissions: a field scale study

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Abstract:
In this study, the CH_4 oxidation in various soil covers will be investigated at two different landfills with different conditions in Australia. Through laboratory experiments, methane oxidation capacity of the soil cover of these two landfills will be studied. Also the effect of gas transport on methane oxidation will be investigated using carbon stable isotope fractionation method. At the end, both laboratory results and field data will be used for verification of an available gas emission and oxidation model (CALMIM).

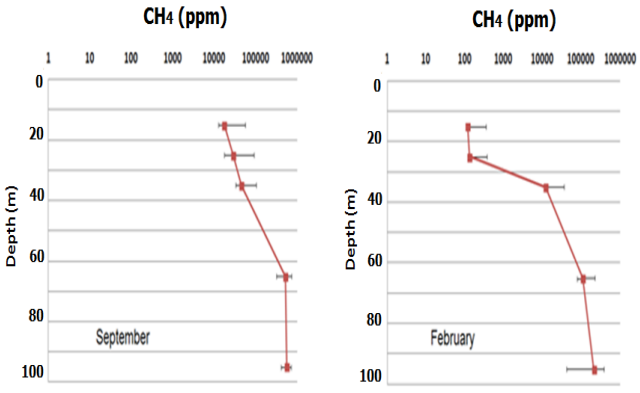
Introduction and Methodology

The primary aim of this thesis is finding a better understanding of how biotic and abiotic factors impact methane oxidation in the soil cover. Achieving this aim explores the following key questions:

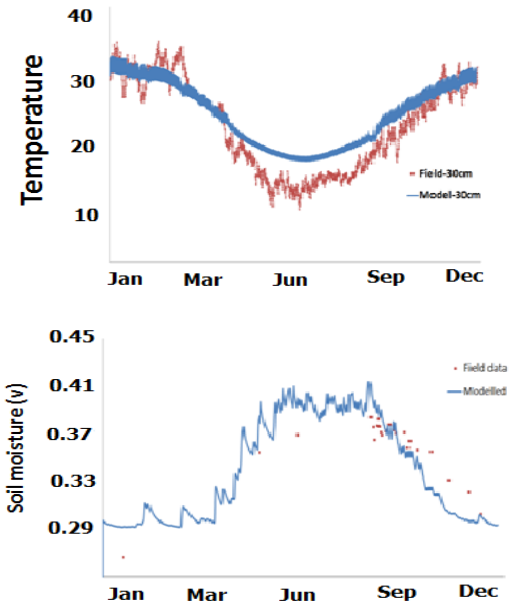
•What is the impact of gas transport on methane oxidation? What is the CH4 concentration in the basement throughout the year for landfills with the gas extraction system and without gas extraction system?

•How much is the oxidizing potential of the soil cover at two different landfills in Australia and what is the role of controlling factor such as soil moisture content and temperature at these landfills? Also at the end, CALMIM is going to be validated for different landfills in Australia to see whether this model is applicable for different conditions or not.

Results and Discussion



CH4 profile for the final cover



Model validation at the Landfill