

Interactive comment on “Mechanisms of methane transport through *Populus trichocarpa*” by Ellyne Kutschera et al.

Anonymous Referee #2

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General comments Further understanding of the role of woody plants as a pathway for methane emissions from wetlands is necessary. Wetlands contribute significant methane to the atmosphere and the contribution from woody stems is unknown. The mechanisms in which soil methane can pass through woody stems are addressed within this research. The focus was to define the ratio of diffuse and sap flux driven methane emissions from woody vegetation and understand the role of temperature on these pathways.

There are some shortcomings with this work that could influence the authors to draw accurate conclusions. For example, confounding variables like vapor pressure deficit in the Tedlar bag compared to ambient vapor pressure deficit could limit the ability to measure transpiration's influence on stem methane emissions.

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Specific comments

- i. Lenticels are described and referenced as a major driver of woody stem methane emissions. The authors do not indicate any measure of the quantity of lenticels.
- ii. The number of lenticels increases due to an elevated water table and the associated stress on the tree, were water levels fluctuated to promote lenticel growth on sample saplings?
- iii. The authors present the fact that black cottonwood is frequently used as a cover species for landfills (page 2 line 28: “This species is used as a landfill cover”). The implication that woody vegetation can allow gases to pass from the soil to the atmosphere is not discussed later in the paper. A connection between the findings and landfill pollutant emissions would be beneficial in the discussion section.
- iv. In the Methods section the authors say that the hydroponically cultivated sample trees were grown in a modified Hougland’s solution; they should indicate how it was modified or give a reference for this step.
- v. The authors should clarify whether or not the air chambers were tested for air-tightness.
- vi. The authors do not state if there was a method to ensure appropriate mixing of air within chambers or Tedlar bags.

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