

Large increase in wetland emissions by GOSAT XCH₄ inversions not supported by process-based models

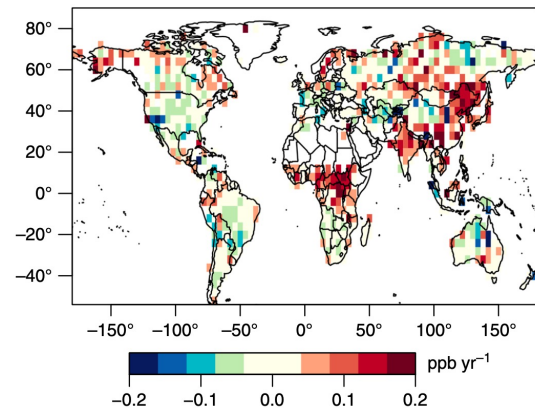
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Background

- Understanding the discrepancies between top-down and bottom-up estimates in CH₄ trends is crucial
- XCH₄ Proxy retrievals suggests leading contributions from tropical wetlands (Yin et al., 2020; Zhang et al., 2021)

XCH₄ Trends in GOSAT RemoteC proxy retrievals for 2009-2015

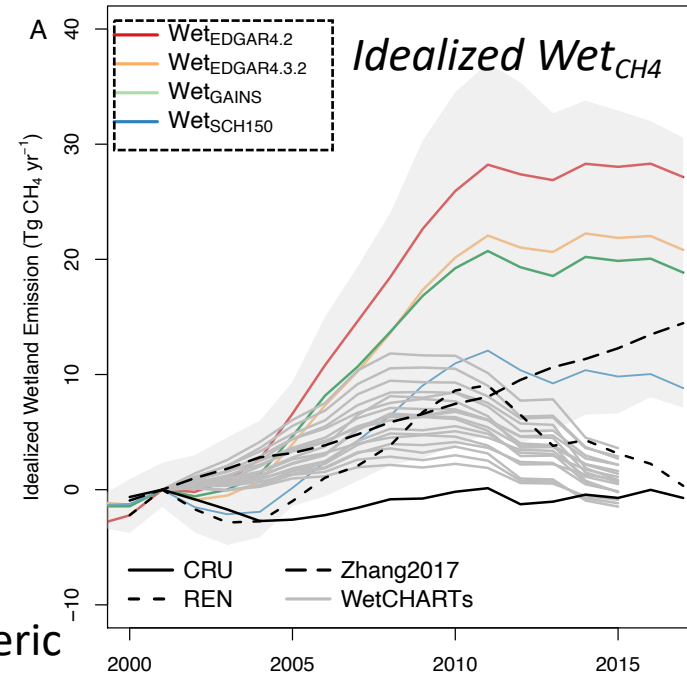


Miller et al., 2019

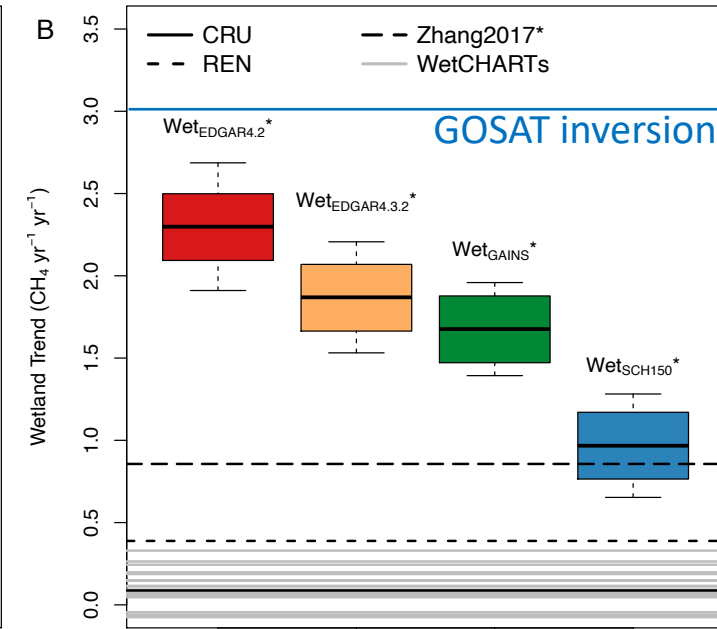
Methods:

- Box model
- Reproduce atmospheric [CH₄] and ¹³C-CH₄
- Large ensemble of emission scenarios
- Considering varying OH and spatial variability in ¹³C-CH₄ in source

How much wetland increase needed



CRU: no trend in Wet_{CH4}; REN: step increase in Wet_{CH4}; Zhang2017: upper bound of climate-CH₄ feedback



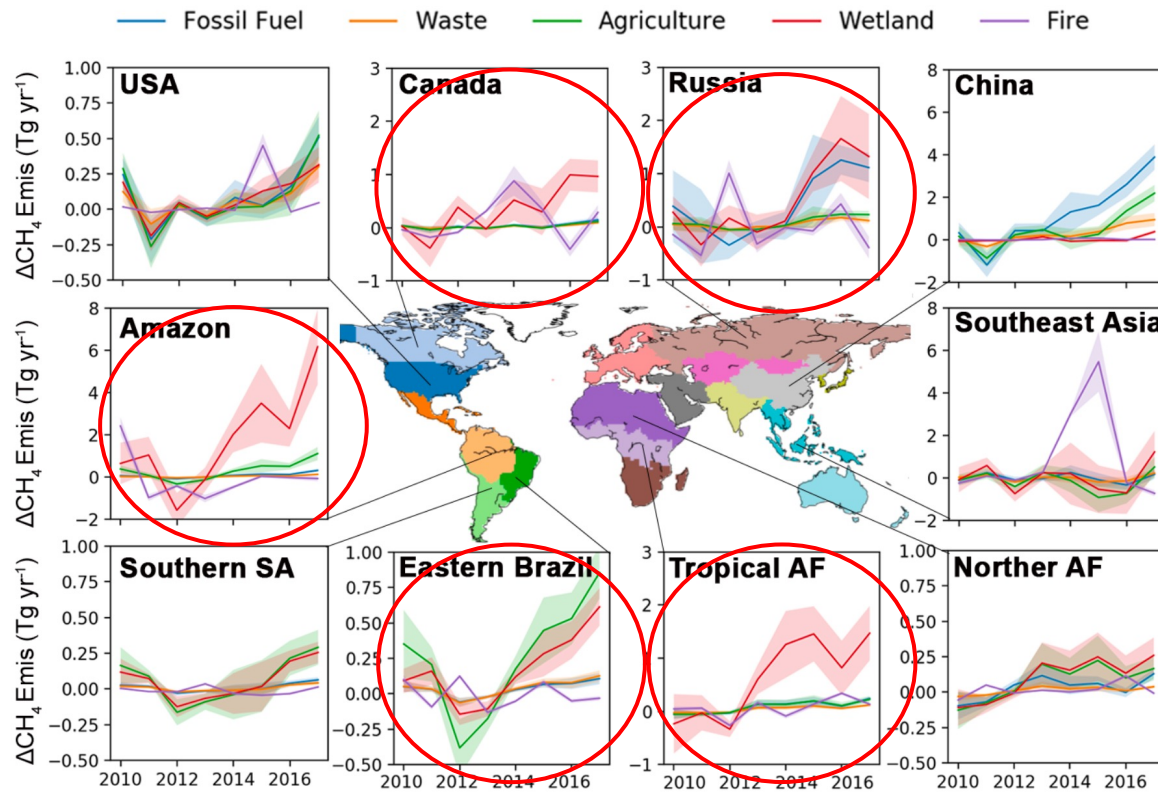
Conclusions

- The large wetland increases from GOSAT XCH₄ inversions are not supported by the process-based models
- Difference in XCH₄ products needs further investigations

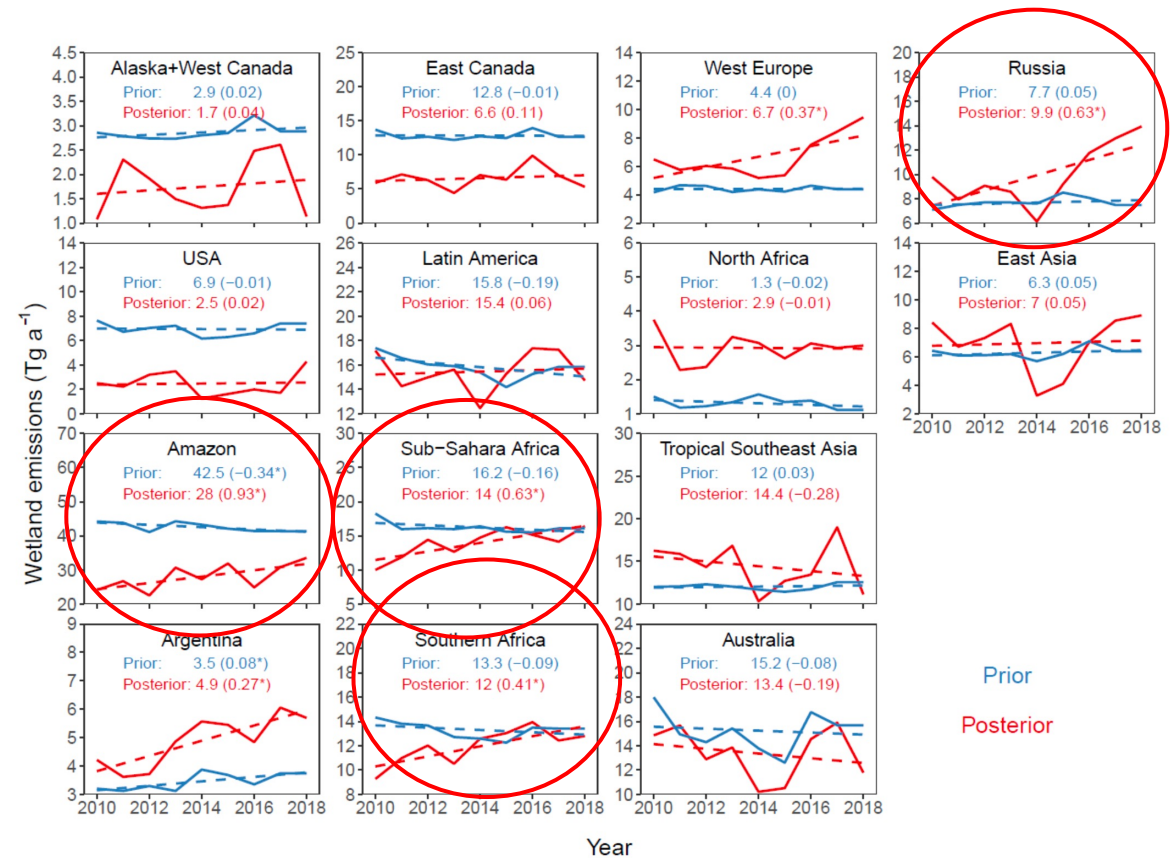
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Two recent inversions point to climate-CH₄ feedbacks

- Both based on GOSAT XCH₄ proxy retrievals
- Suggest widespread increases in wetland CH₄ at 2-3 Tg yr⁻¹ yr⁻¹ for 2010-2018



Yin et al., 2020



Zhang et al., 2020