Methane emission potential across subtropical, temperate, and arctic ecosystems

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Introduction

- In 2021 atmospheric methane concentrations hit another record high (Figure 1).

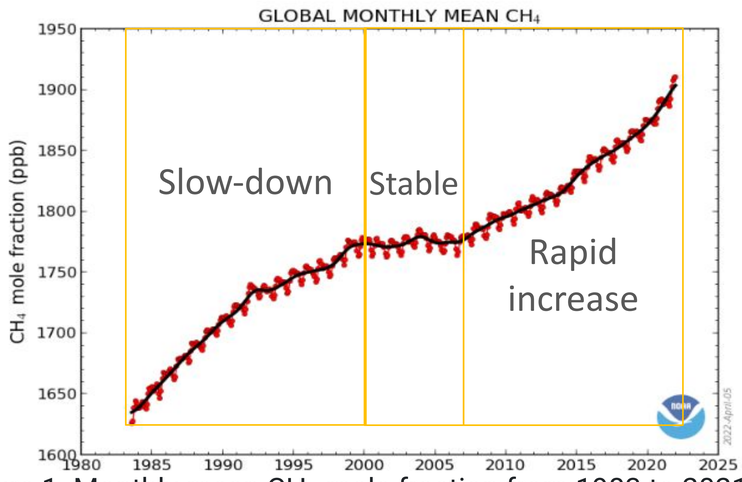


Figure 1. Monthly mean CH_4 mole fraction from 1983 to 2021.

- The large decrease in $\delta^{13}C$-CH_4 2005 - 2021 may indicate that the increase in CH_4 concentrations in the atmosphere (Figure 1) may be from biogenic sources (Figure 2).

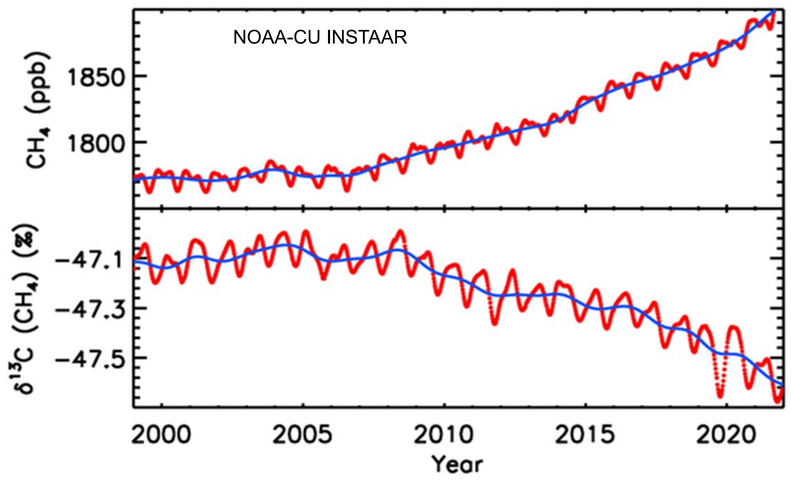
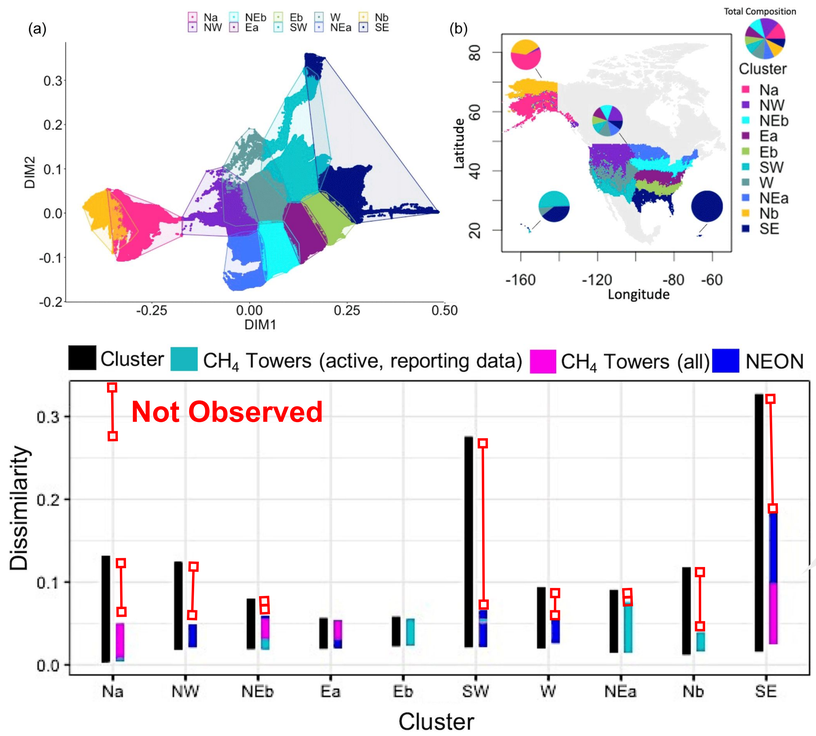


Figure 2. (top)Monthly mean CH_4 mole fraction 1999 to 2021 and (bottom) monthly mean $\delta^{13}C$-CH_4.

- While there are alot of ideas about what is leading to rising atmospheric CH_4 concentrations, we don't know if it is caused by changes in sinks or source of CH_4.

- Since methane mitigation is an important strategy to constrain runaway warming, we need adequate infrastructure to understand biogenic methane.

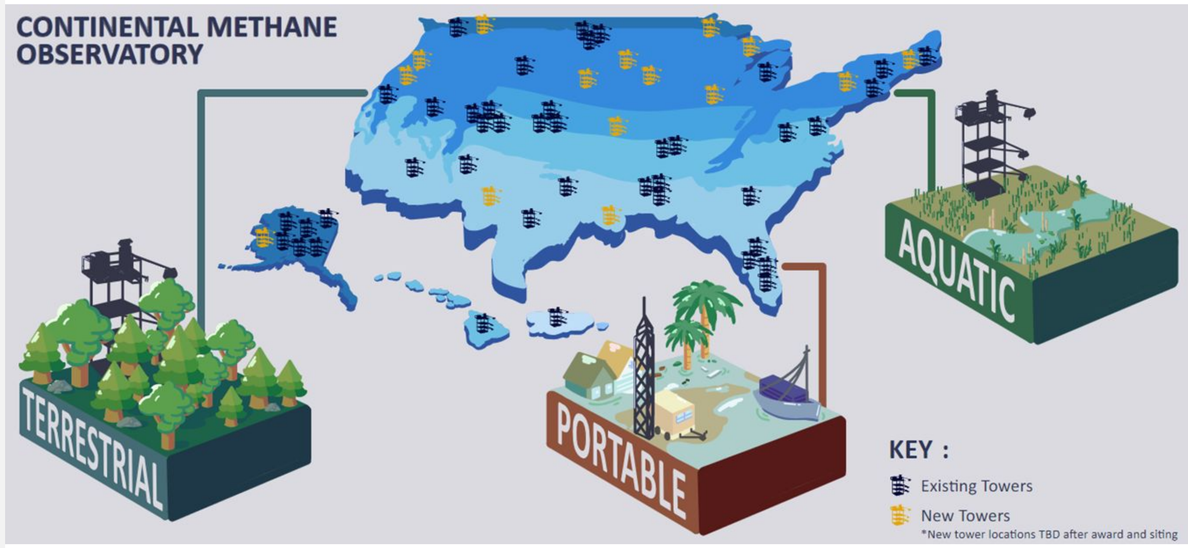
Gaps in Network Infrastructure



Clusters require additional infrastructure to sample the range of climates observed.

Figure 3. The U.S. was divided into 10 climate clusters. The dissimilarity of an entire cluster (black) is then compared to the dissimilarity of tower locations.

Continental Methane Observatory



Feedback Survey

Mid-scale Infrastructure