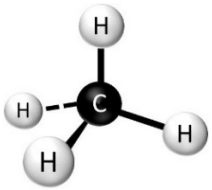
FLUXNET-CH_4 synthesis activity: Objectives, observations, and future directions

Gavin McNicol[1], Sara Knox[1], Etienne Fluet-Chouinard[1], Benjamin Poulter[2], Rob Jackson[1] *et al.*

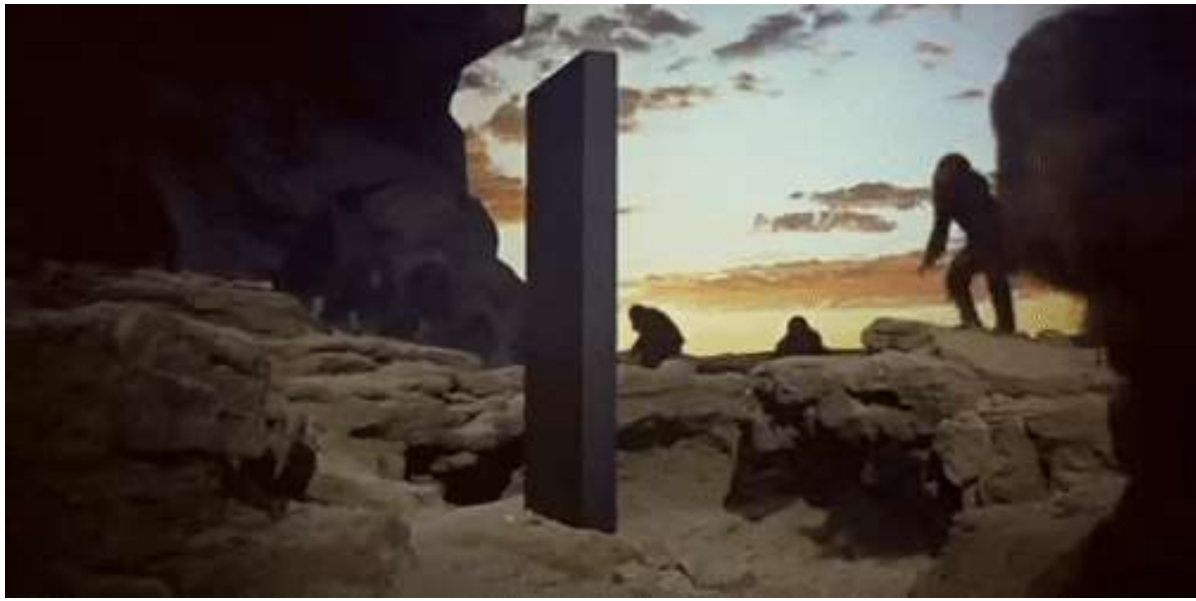
[1.] *Stanford University*

[2.] *NASA Goddard*



A Growing Flux Network
How far have we come?

1998: NASA funds FLUXNET



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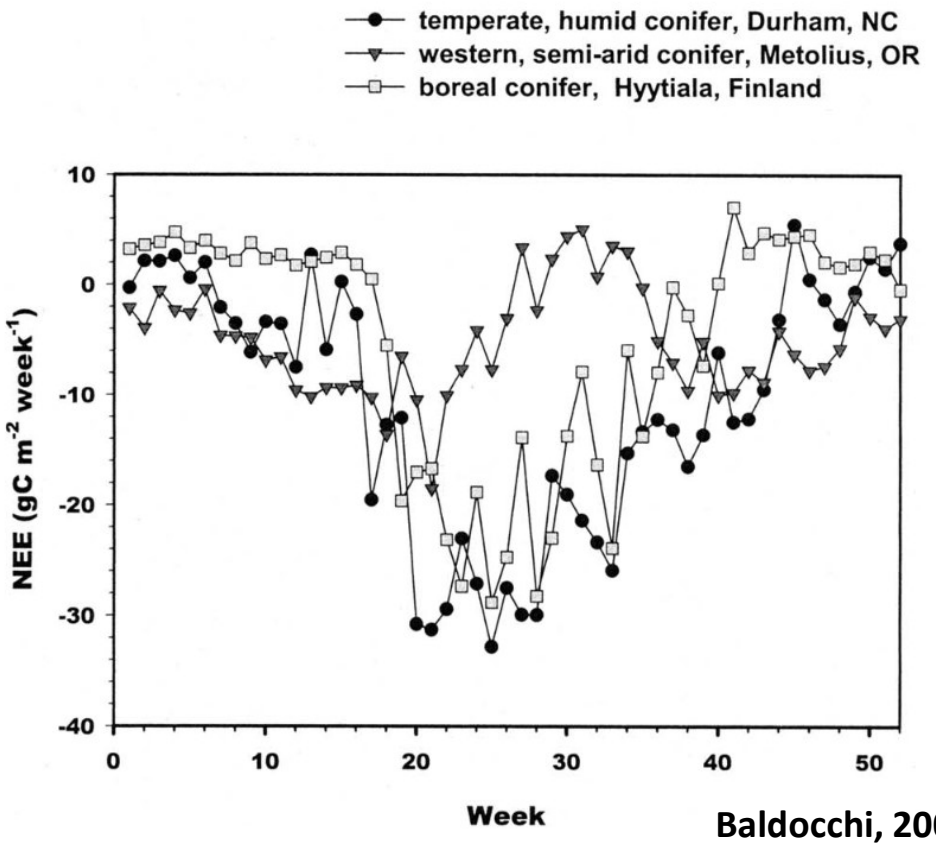

Baldocchi, 2001

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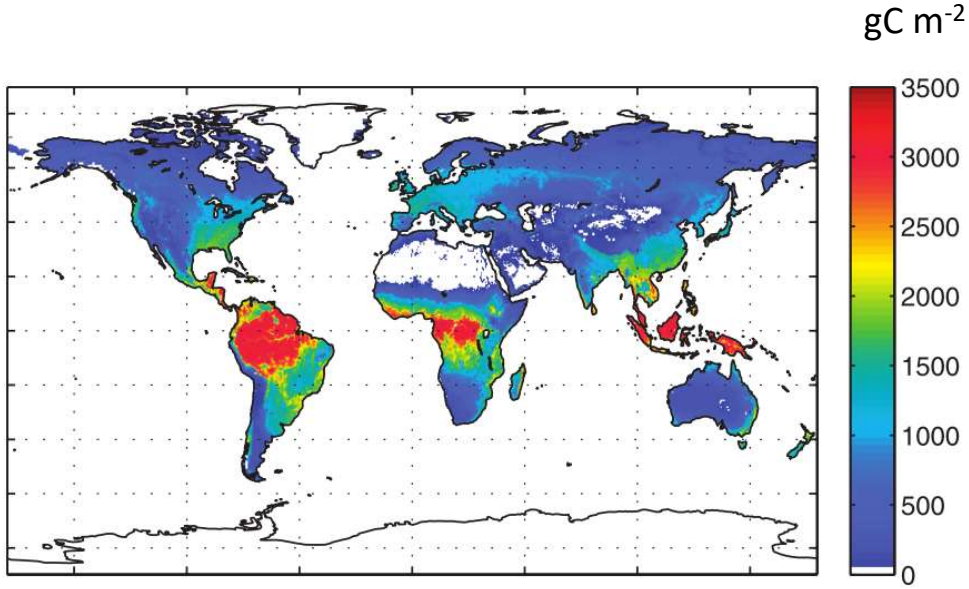

Beer et al. 2010

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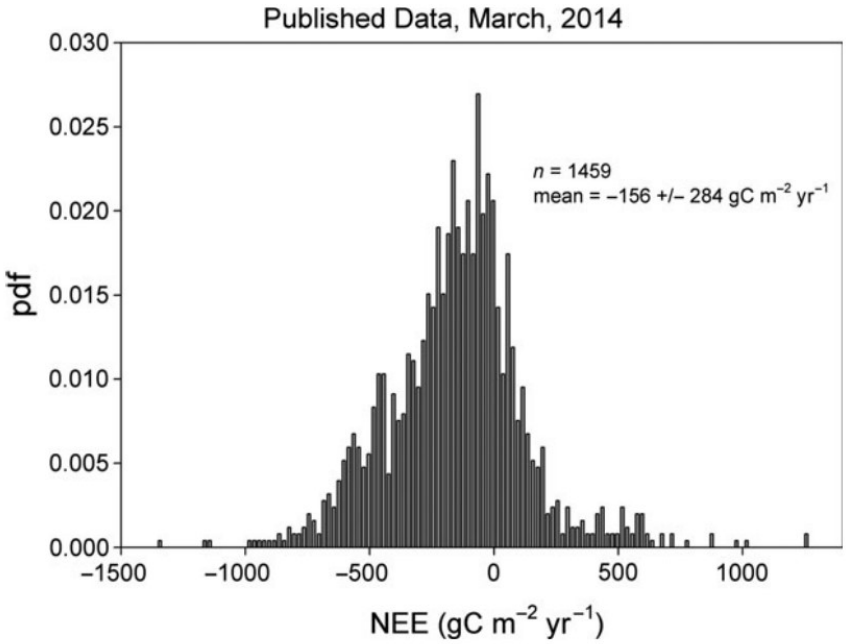

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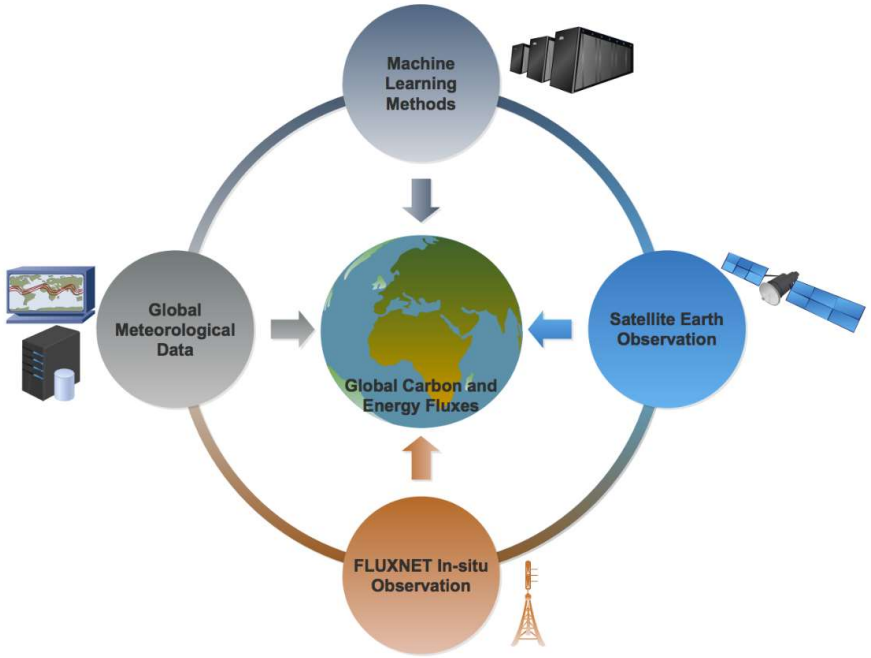
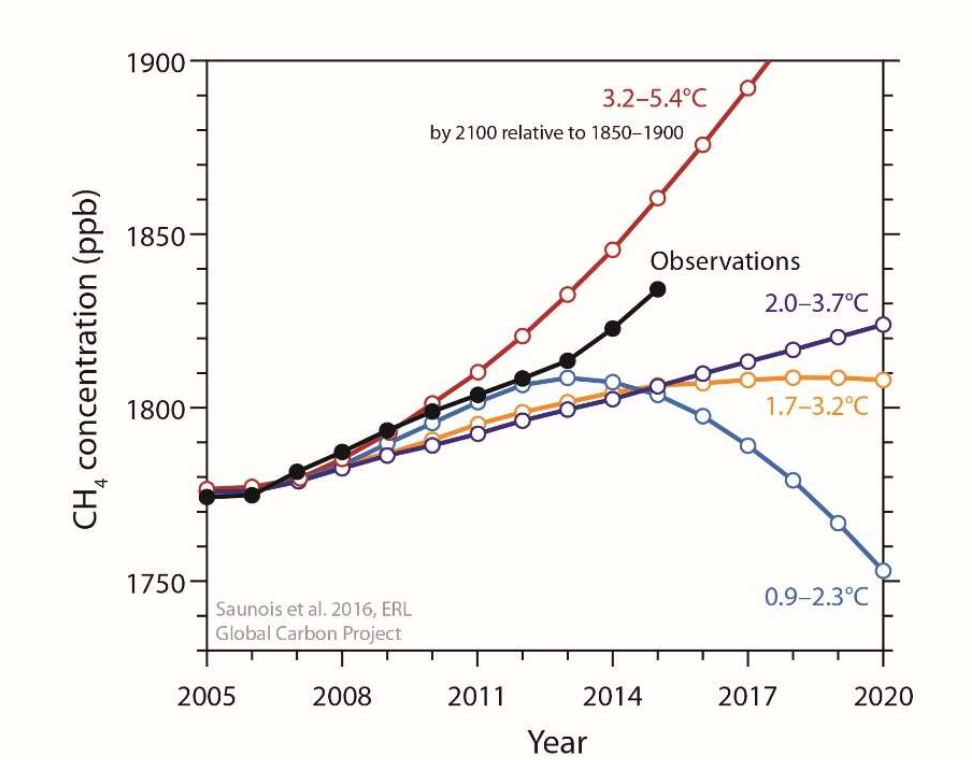
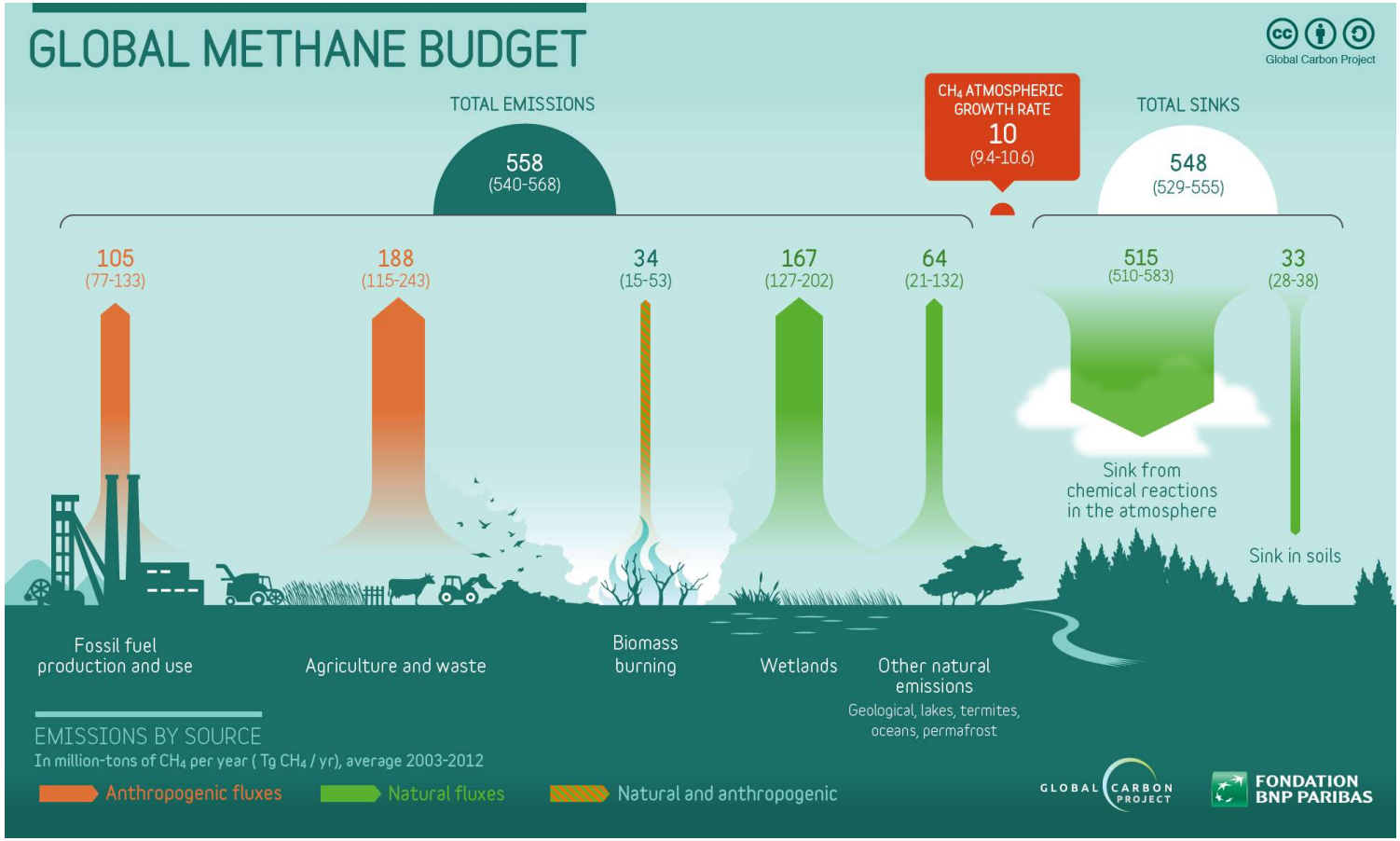
2016: FLUXCOM effort



Atmospheric CH_4 Burden
Unattributed trends



Moore Foundation
Constraining the global methane budget



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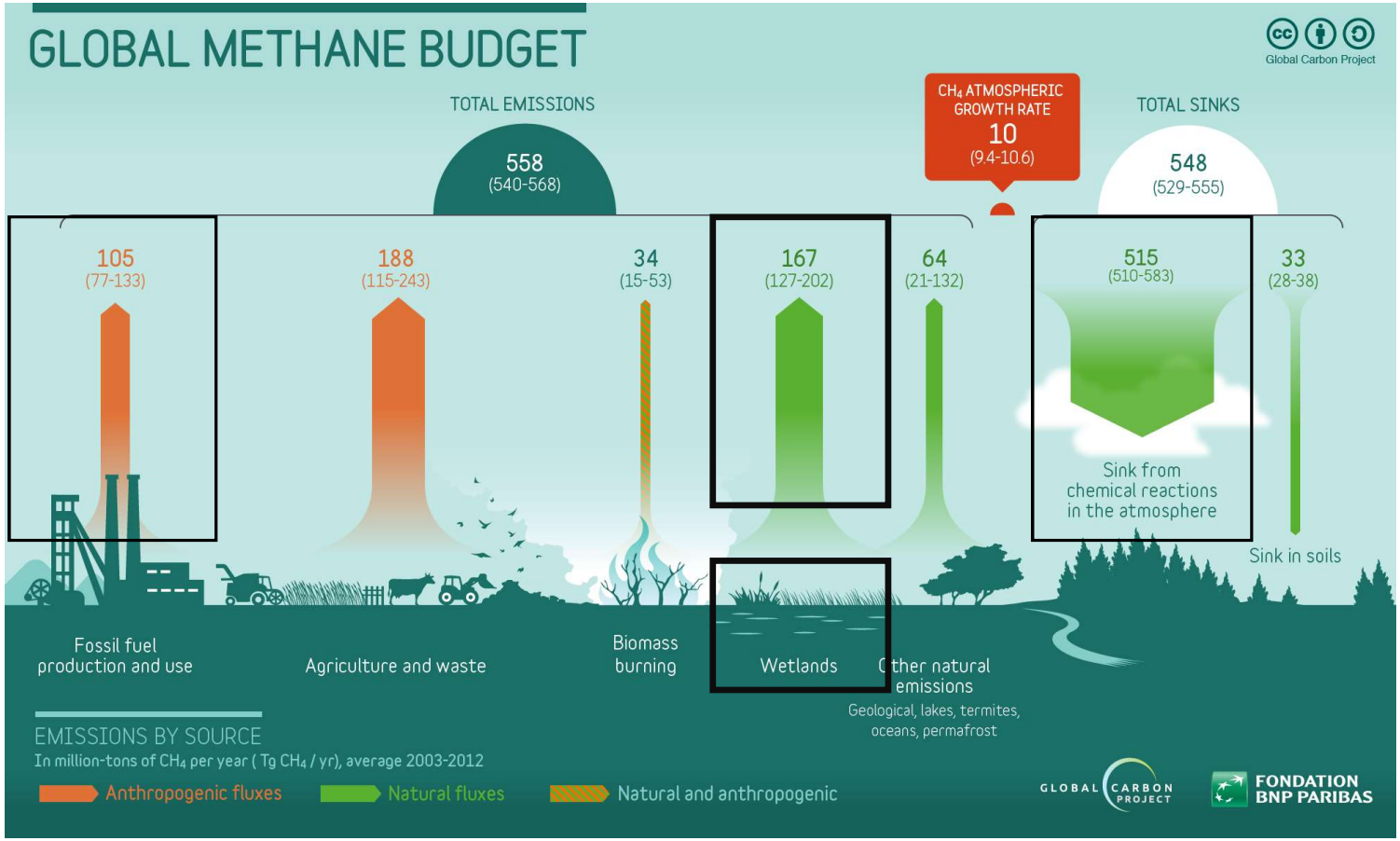

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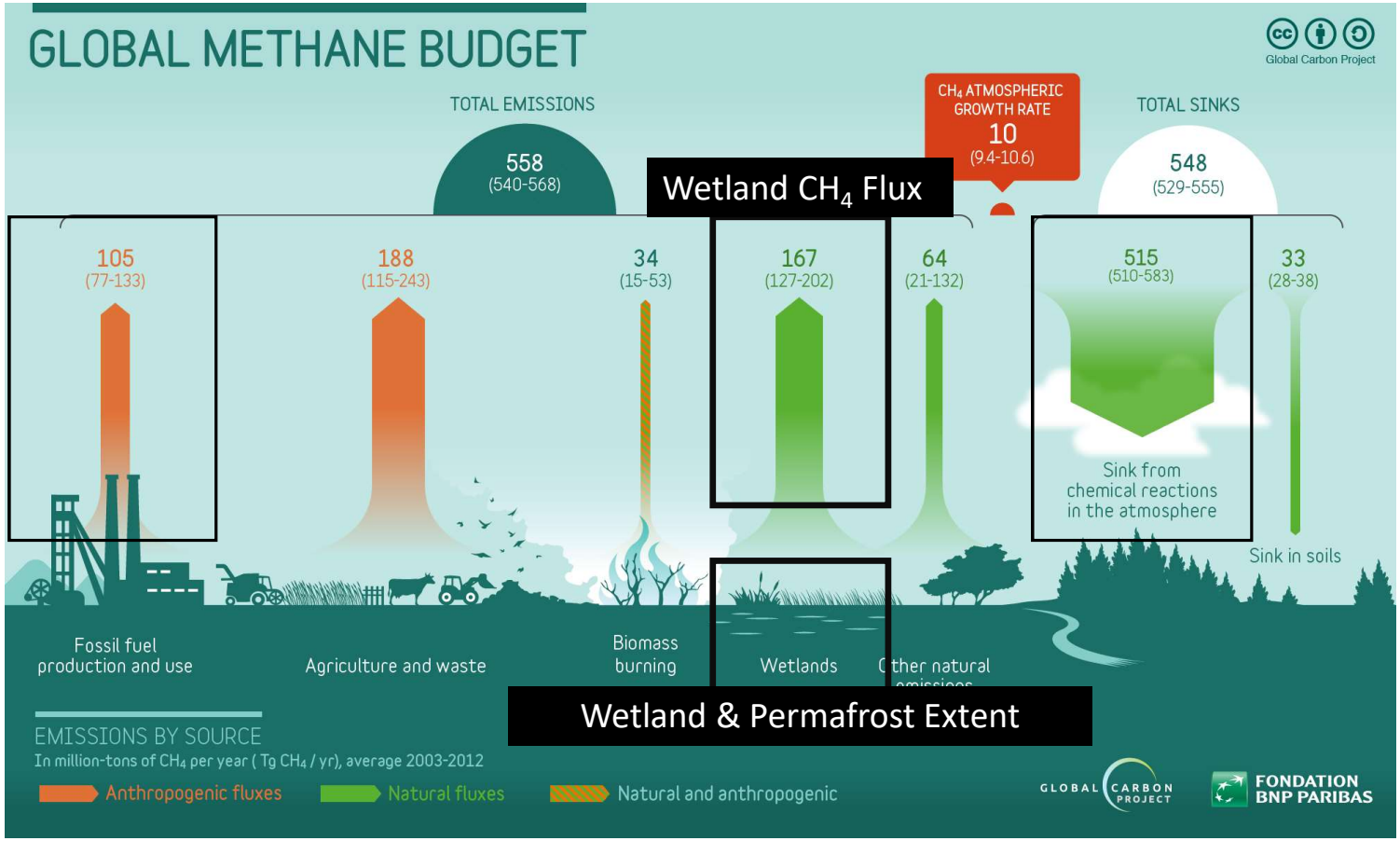
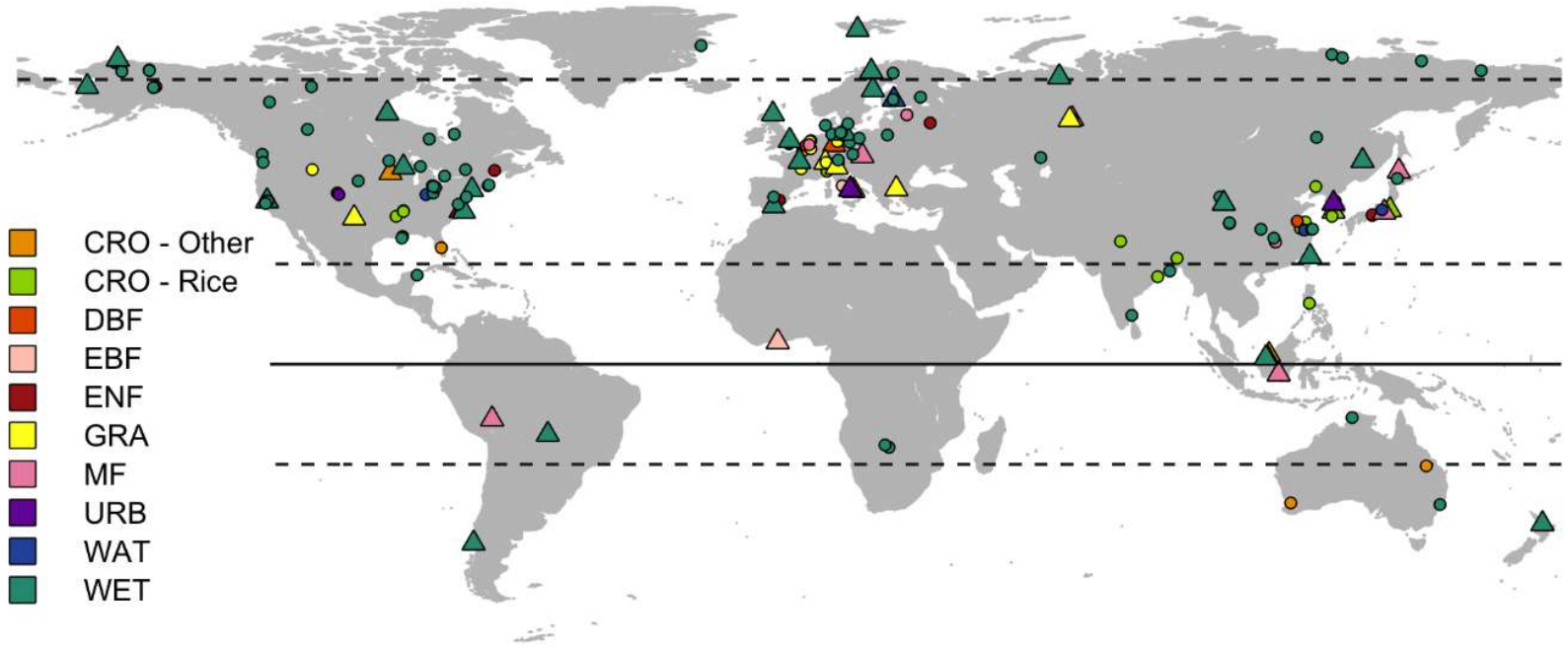


Towards a FLUXNET-CH_4 Database
Identifying sites



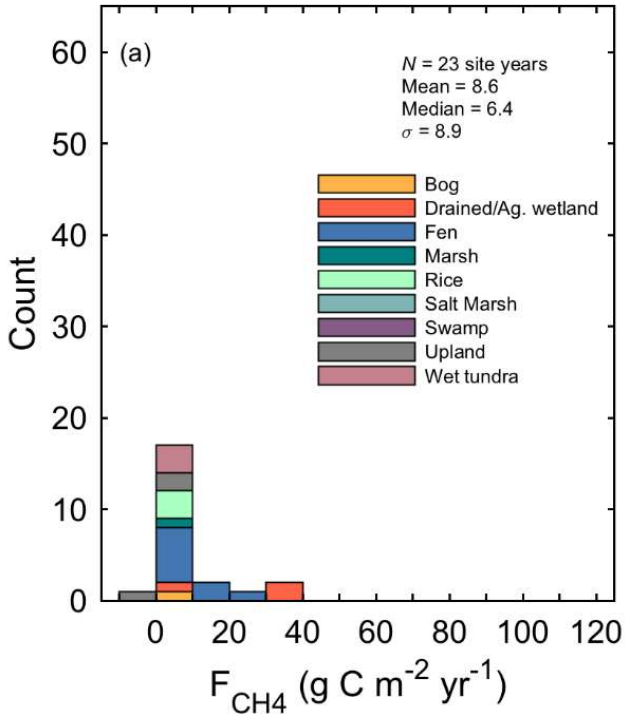
Knox et al. *submitted BAMS*

Global Wetland CH_4 Fluxes

Results from first 49 sites

Knox et al. *submitted BAMS*

Fluxes by wetland class
More site-years, higher fluxes



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Adapted (**Baldocchi, 2014**)

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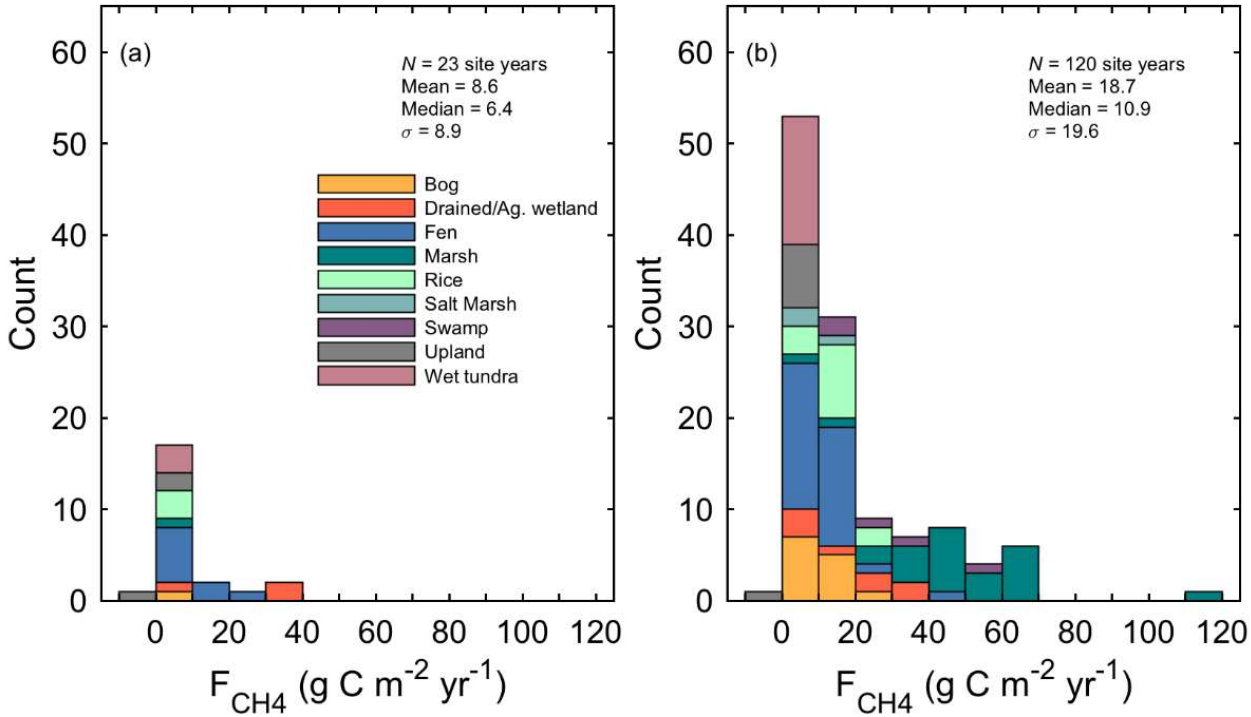
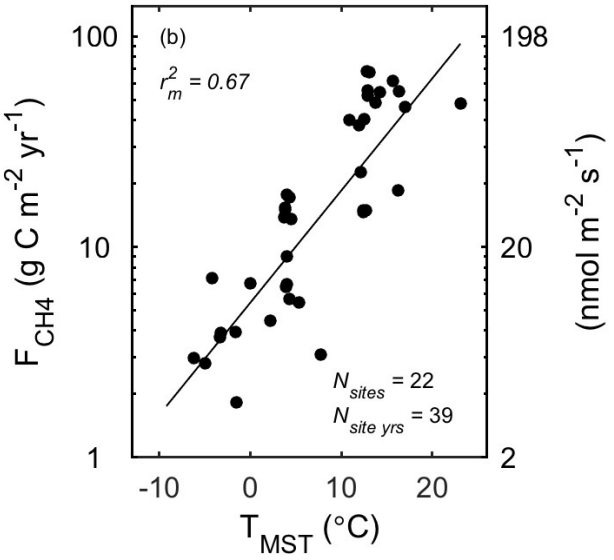


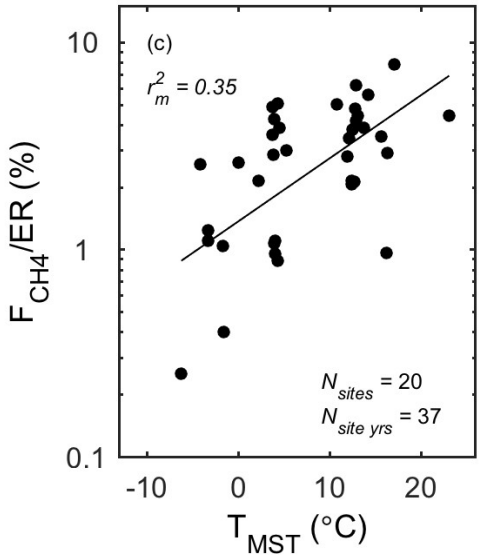
Knox et al. *submitted BAMS*

Adapted (**Baldocchi, 2014**)

(through 2017)

Drivers of CH_4 flux
A global temperature response





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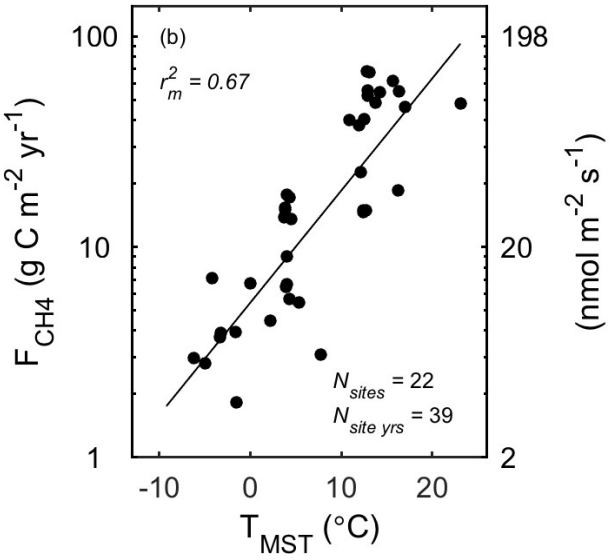
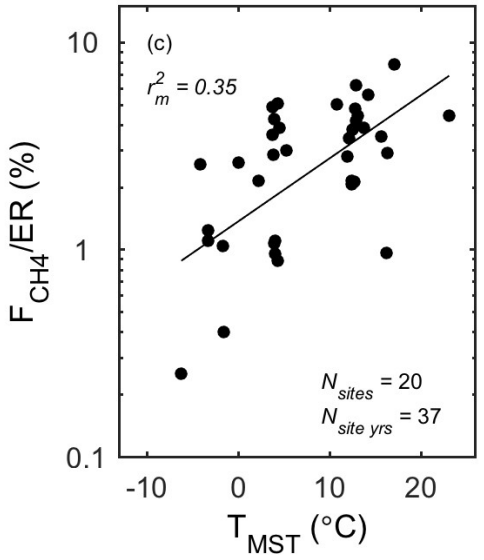




Water-table: many sites lack observations

GPP: not significant for annual fluxes

Knox et al. ***submitted BAMS***

Next Steps 1:
Powell Synthesis Work

2019 WORKING GROUP

Wetland fluxnet synthesis for methane: understanding and predicting methane fluxes at daily to interannual timescales

Principal investigators: Rob Jackson (Stanford University), Sara H Knox (Stanford University), Lisamarie Windham-Myers (USGS Branch of Regional Research, Western Region), Benjamin Poulter (National Aeronautics and Space Administration)

Read Project Highlights

Jackson Lab postdoc:

EC and biogeochemical modeling

EC CH_4 Database

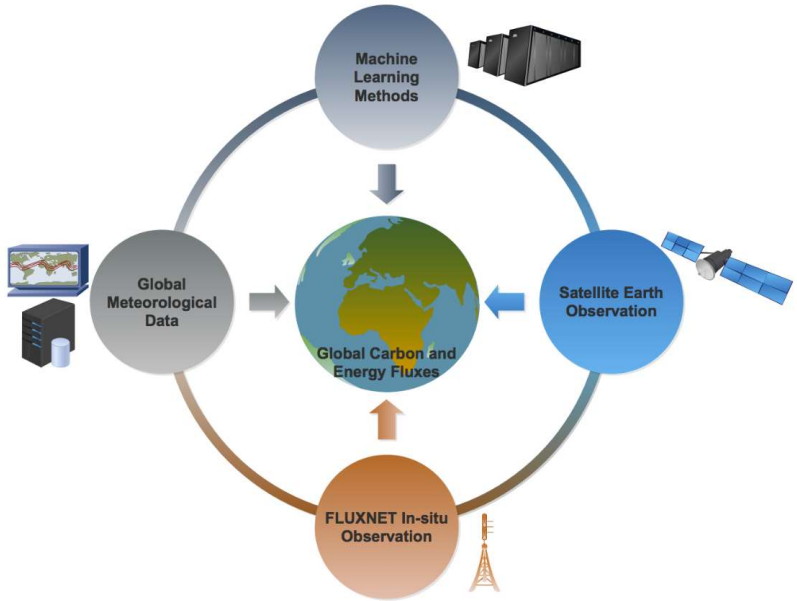
Workshops:
February 2019
October 2019

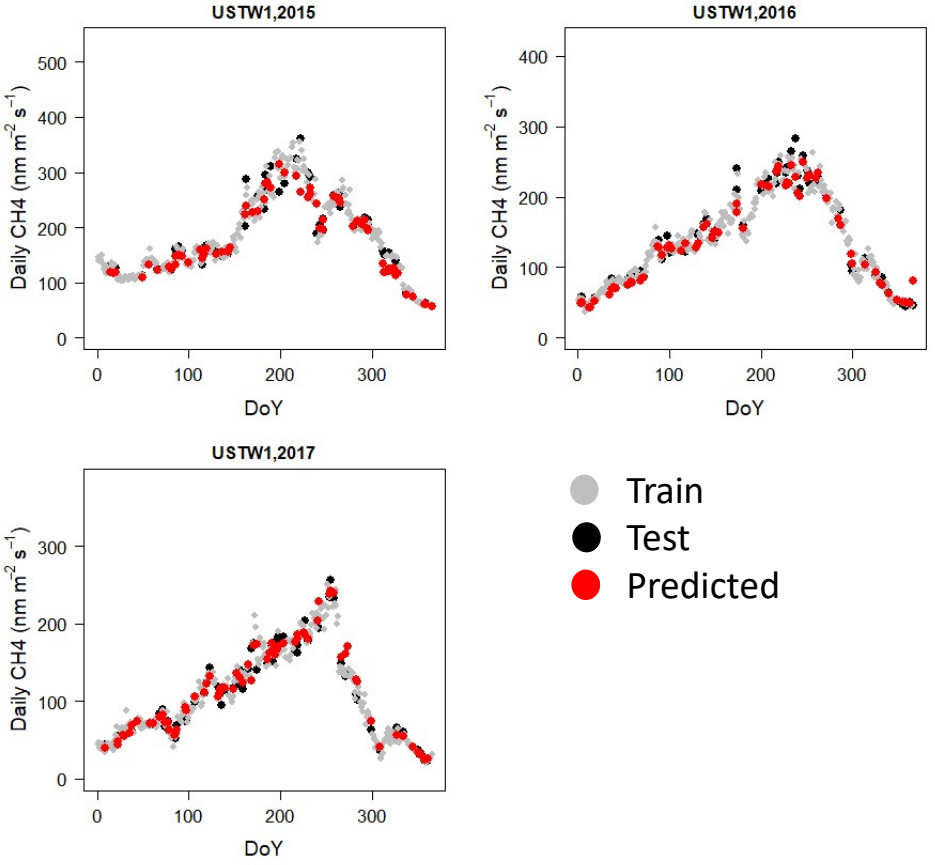
Coordinate/lead process studies

Causality with overlapping drivers
Scale-specific mechanisms
Lagged and non-linear processes
(e.g. water table)
Global signals (e.g. ENSO)

Next steps 2:
Wetland CH_4 upscaling

Similar approach to FLUXCOM initiative





More collaboration
Building a CH_4 'pipeline'

Sites

Site PIs

Regional Networks
Compilation
QAQC

AmeriFlux
Year of Methane
Quality & Impact

Synthesis Activities
Prediction (e.g. global product)
Attribution (e.g. process studies)
Standardization (e.g. RINGO, gap-filling)
Coastal Carbon RCN

FLUXNET-CH_4
CH_4 Release
New Science!

Global Product
Wetlands
Methane budget

Methane fluxes, everywhere, all of the time

Thank you!