# Update on investigating $CH_4$ emissions from tropical wetlands

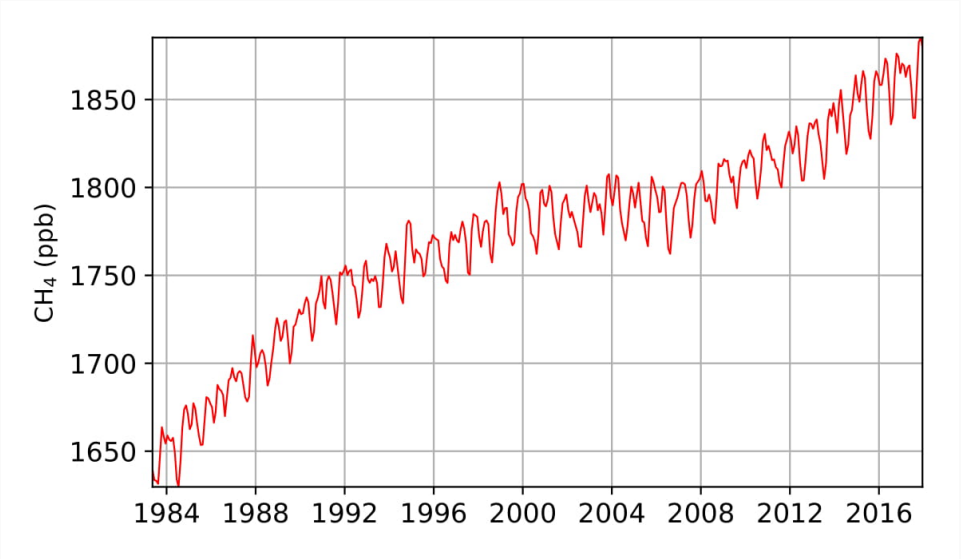
**A.Klemme**

T. Warneke, N. Daskalakis, M. Vrekoussis, J. Notholt

November 22, 2019

Universität Bremen

# Motivation




NOAA, Mauna Loa [Dlugokencky et al., 2017]

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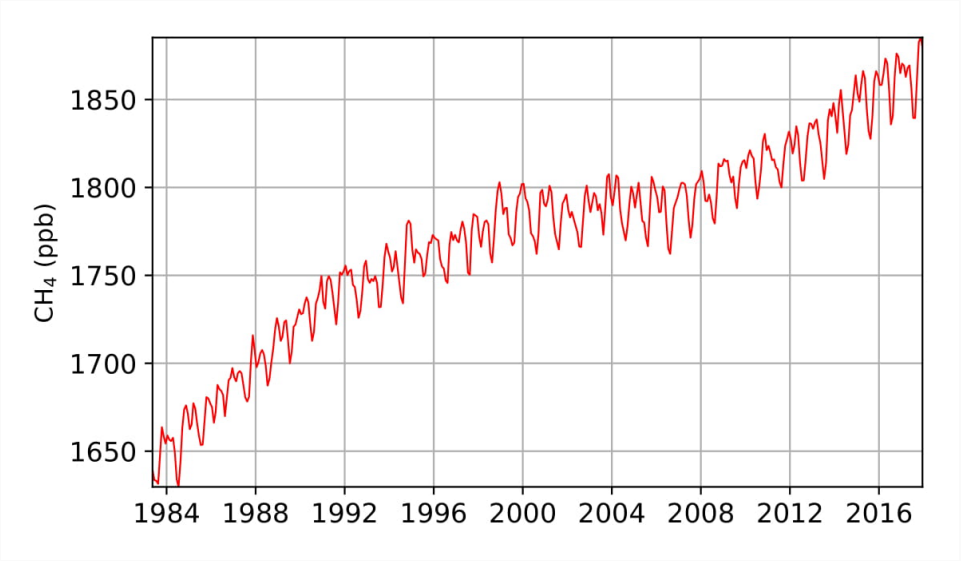


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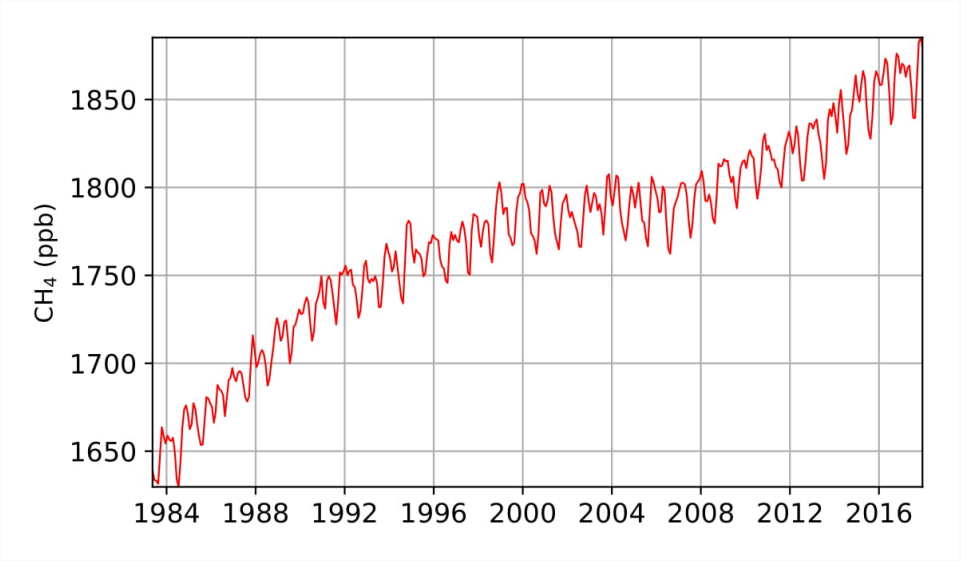


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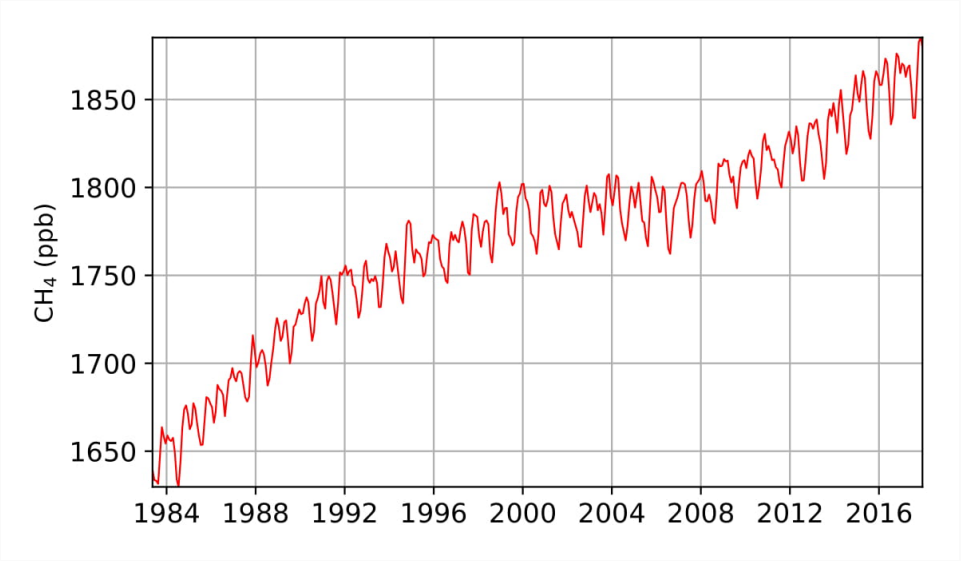


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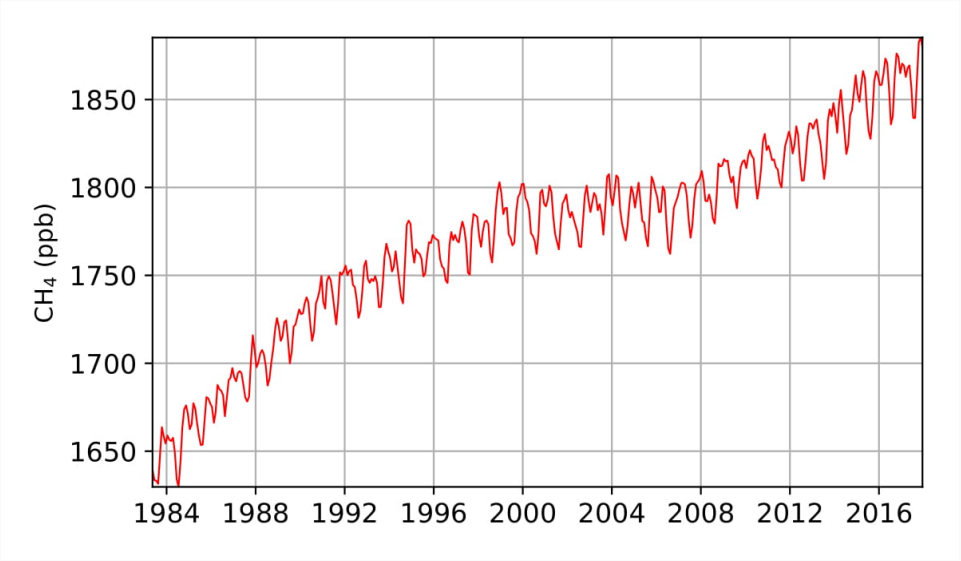


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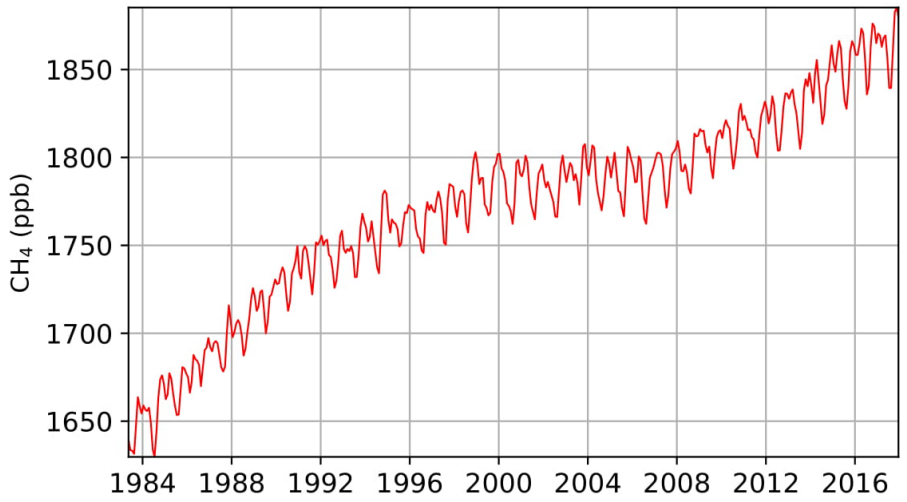


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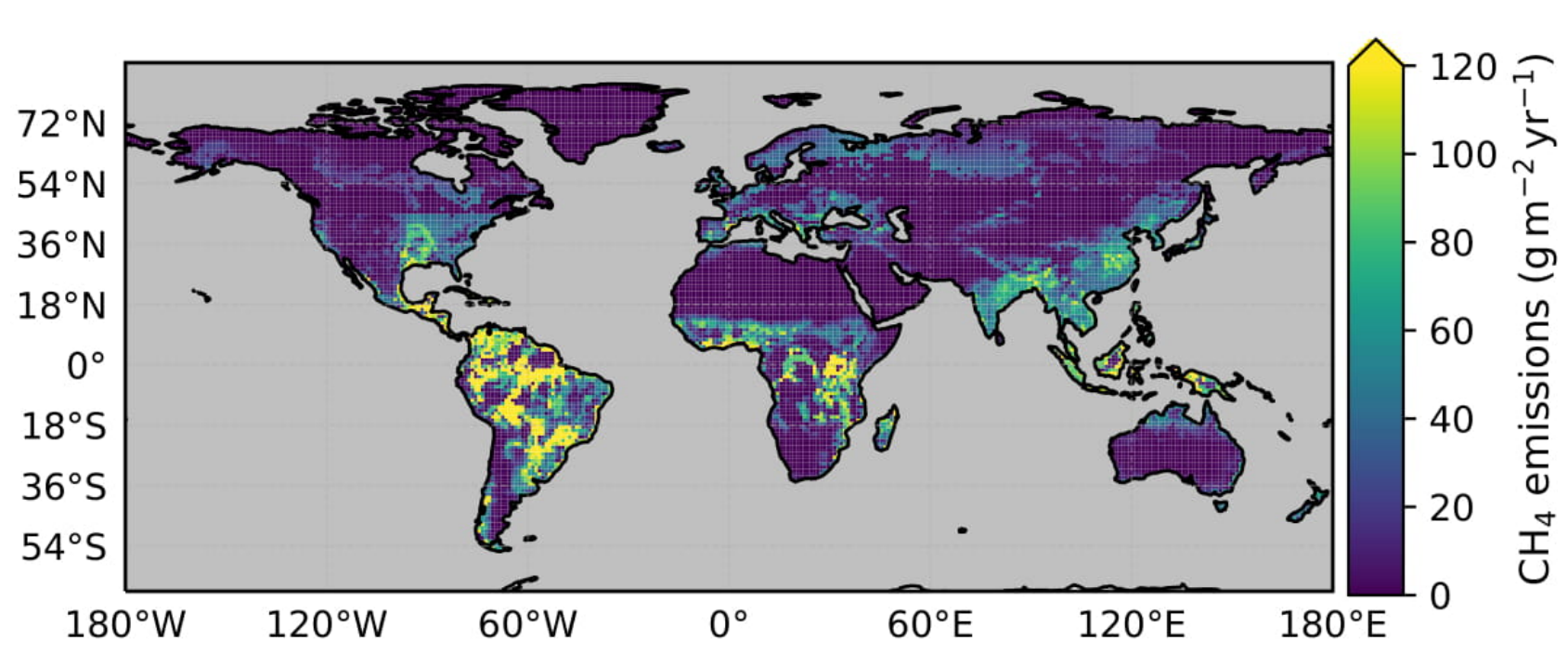
- Natural wetland emissions: 20 to 50 % of global $CH_4$ emissions
  - waterlogged areas of high carbon content $\rightarrow$ methanogenesis
- $>$ 50 % of wetl. emis. between 25 °N and 25 °S

# Global distribution of rice & wetland emissions




HYMN [Spahni et al., 2011]

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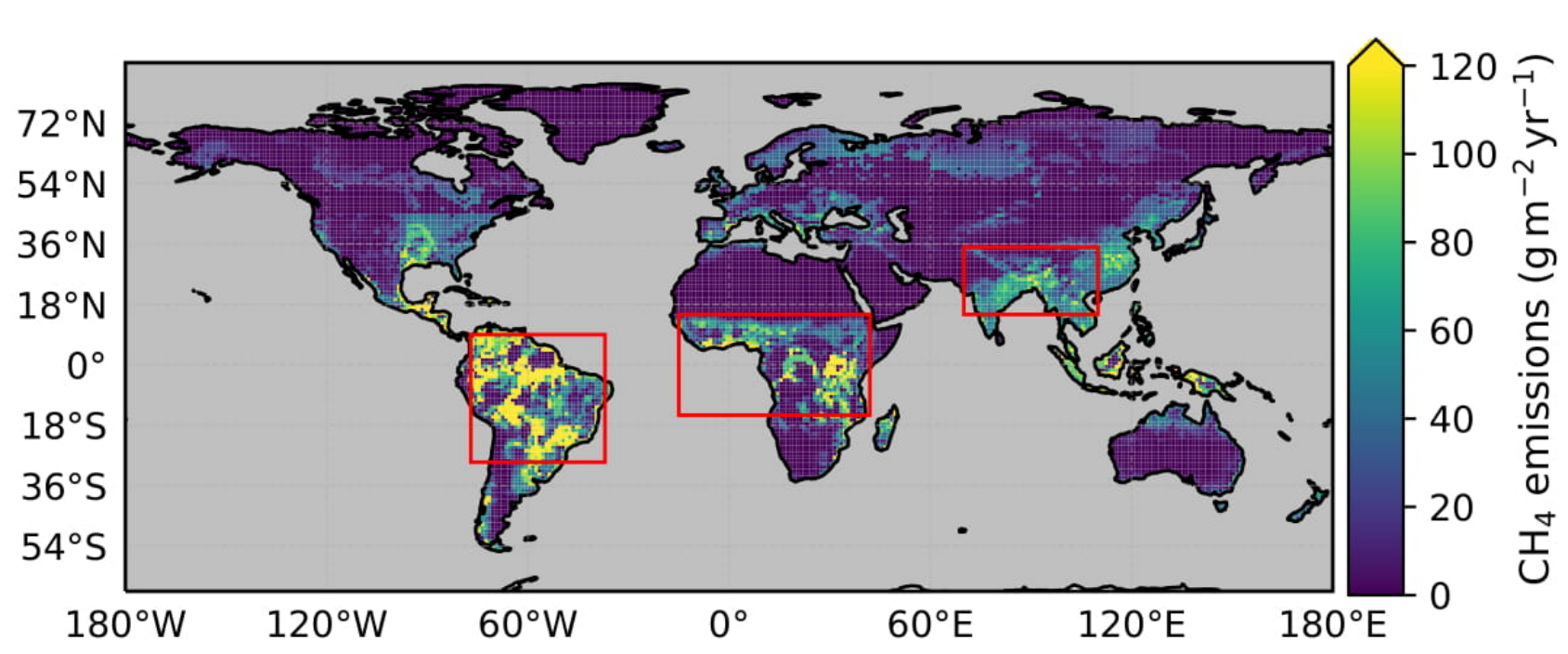


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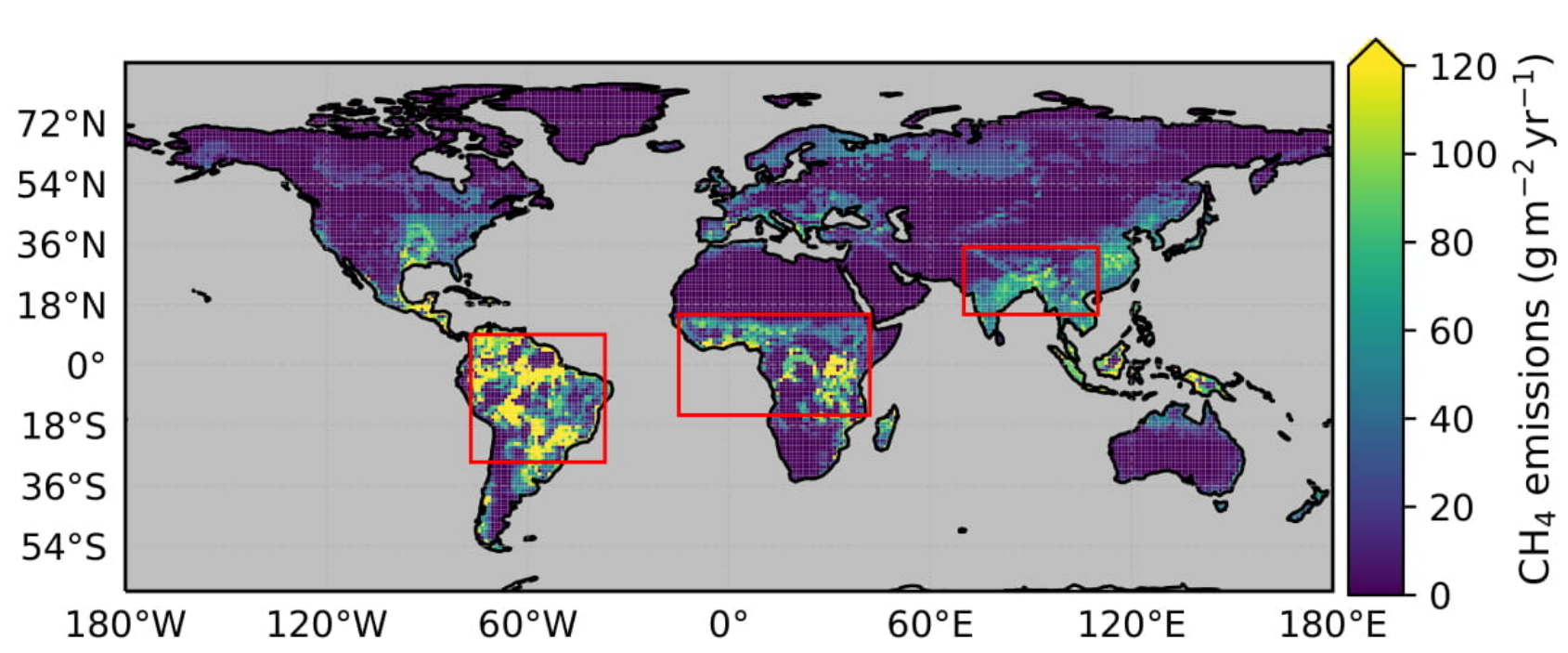
## Interesting emission regions:

- Amazon river basin
- Congo river basin
- Ganges-Brahmaputra-Meghna river basin

# Impact of local emissions on atmospheric $CH_4$ concentrations




Two model runs for atmospheric methane:

1. calculated with full emission product
2. calculated excluding local emissions

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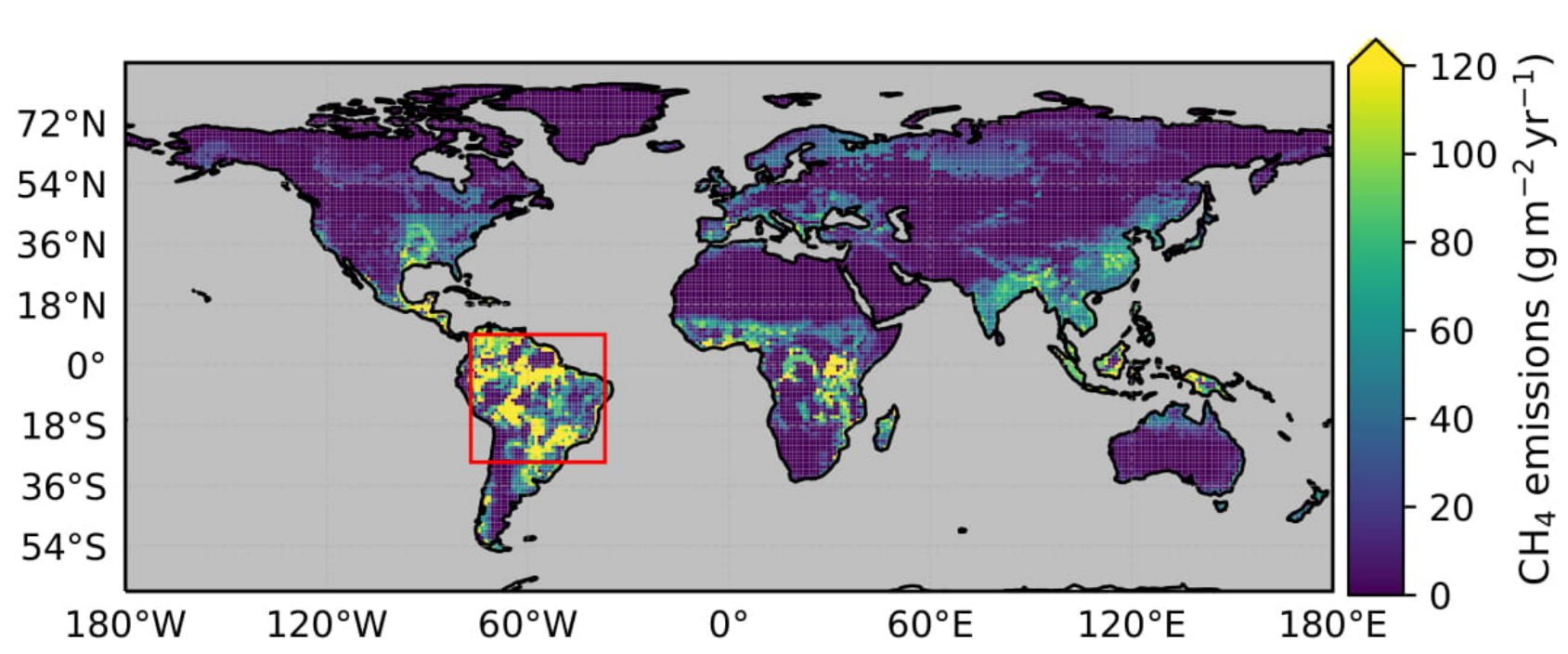


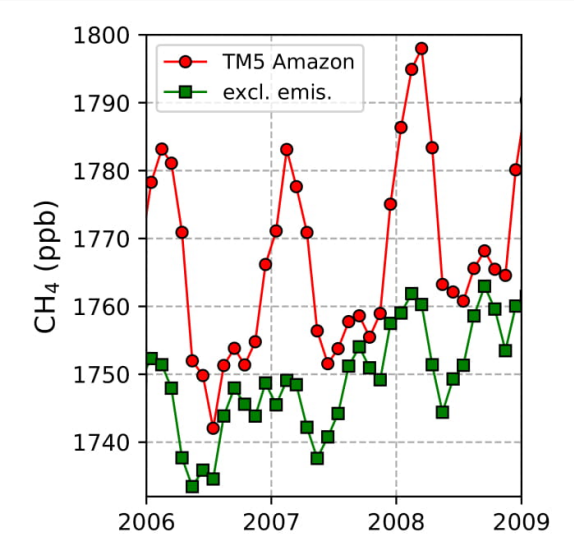

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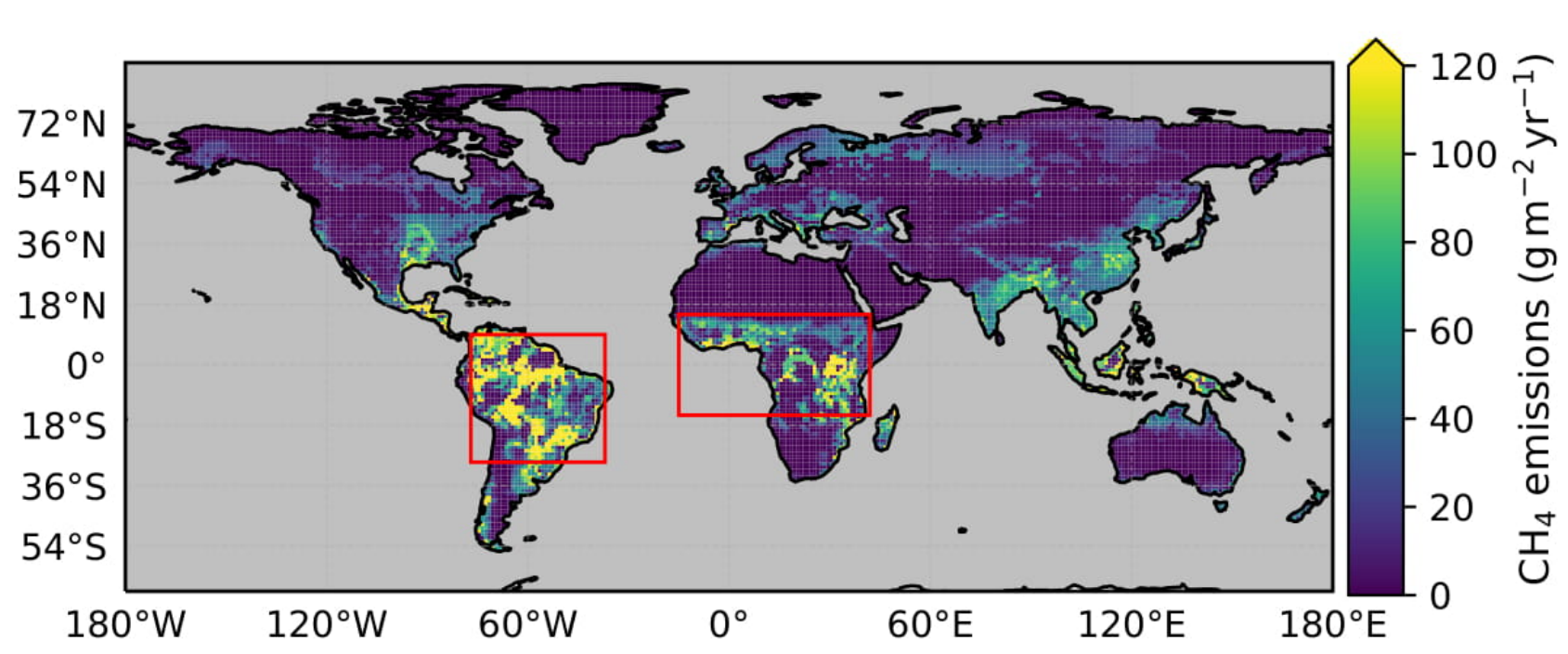


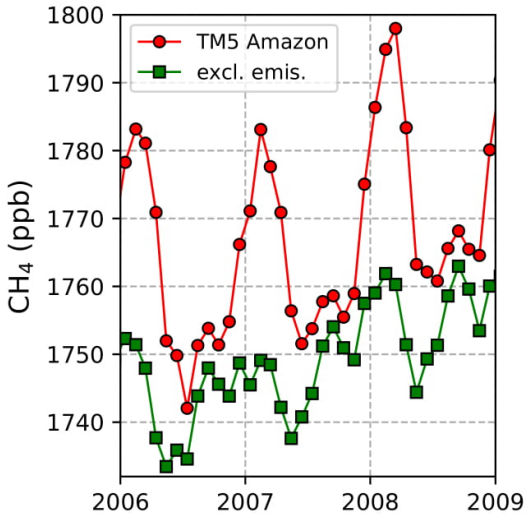


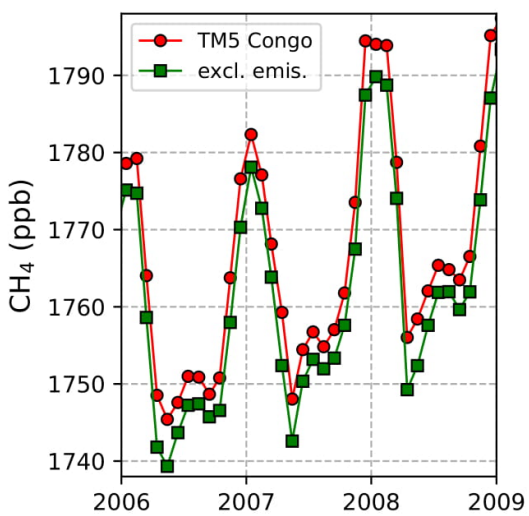

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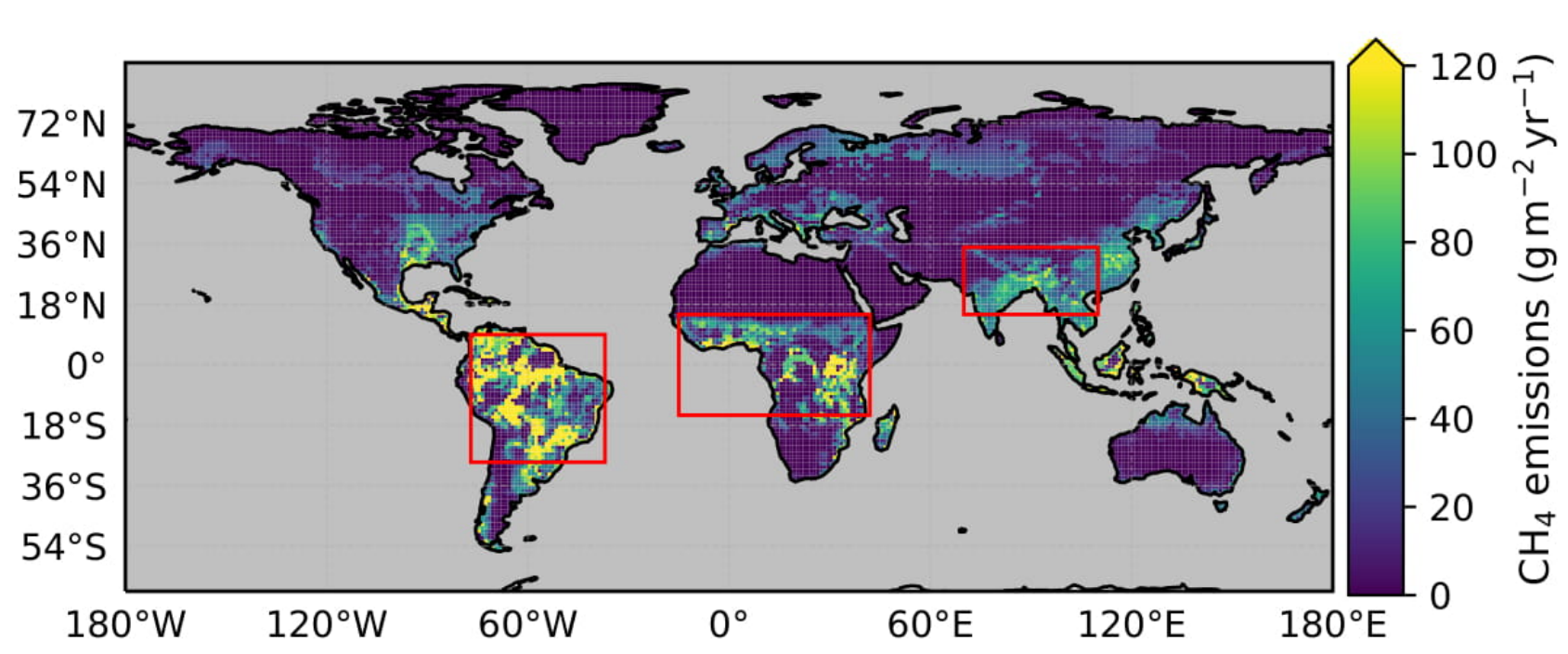


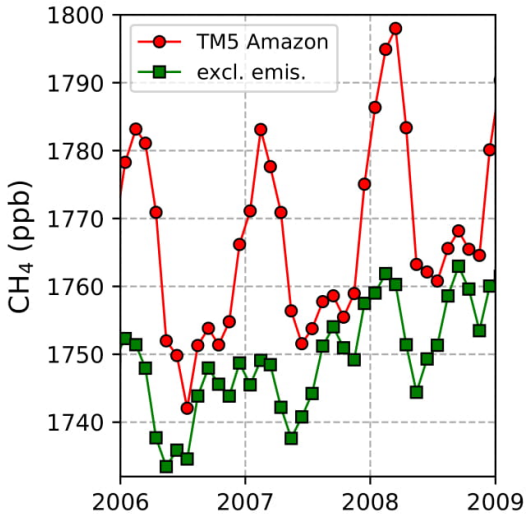


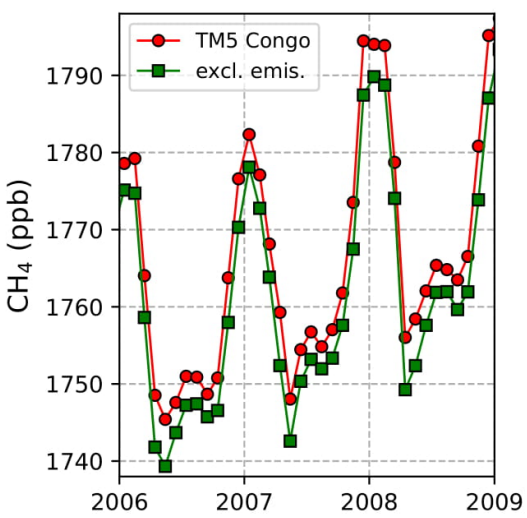


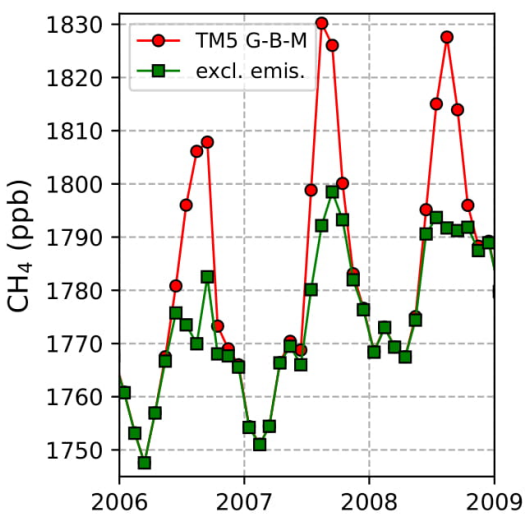

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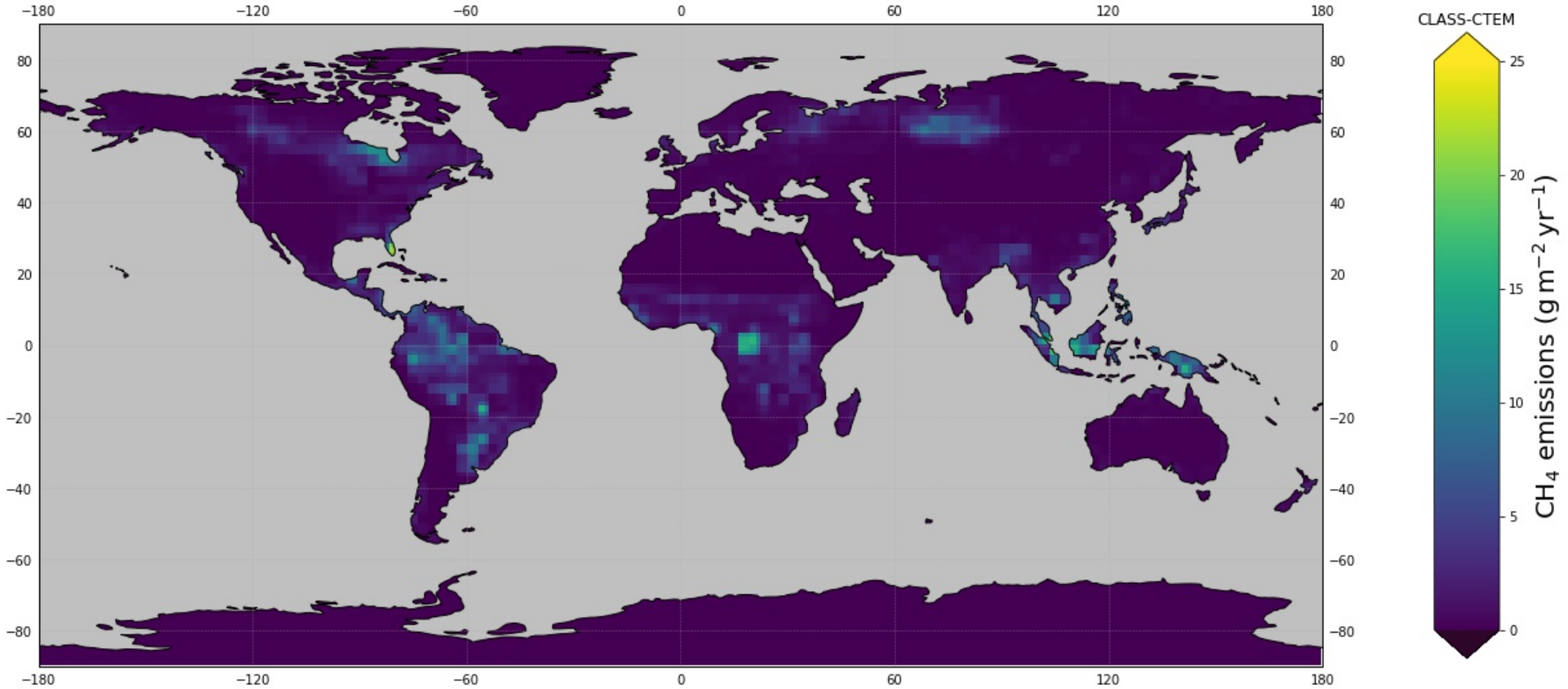

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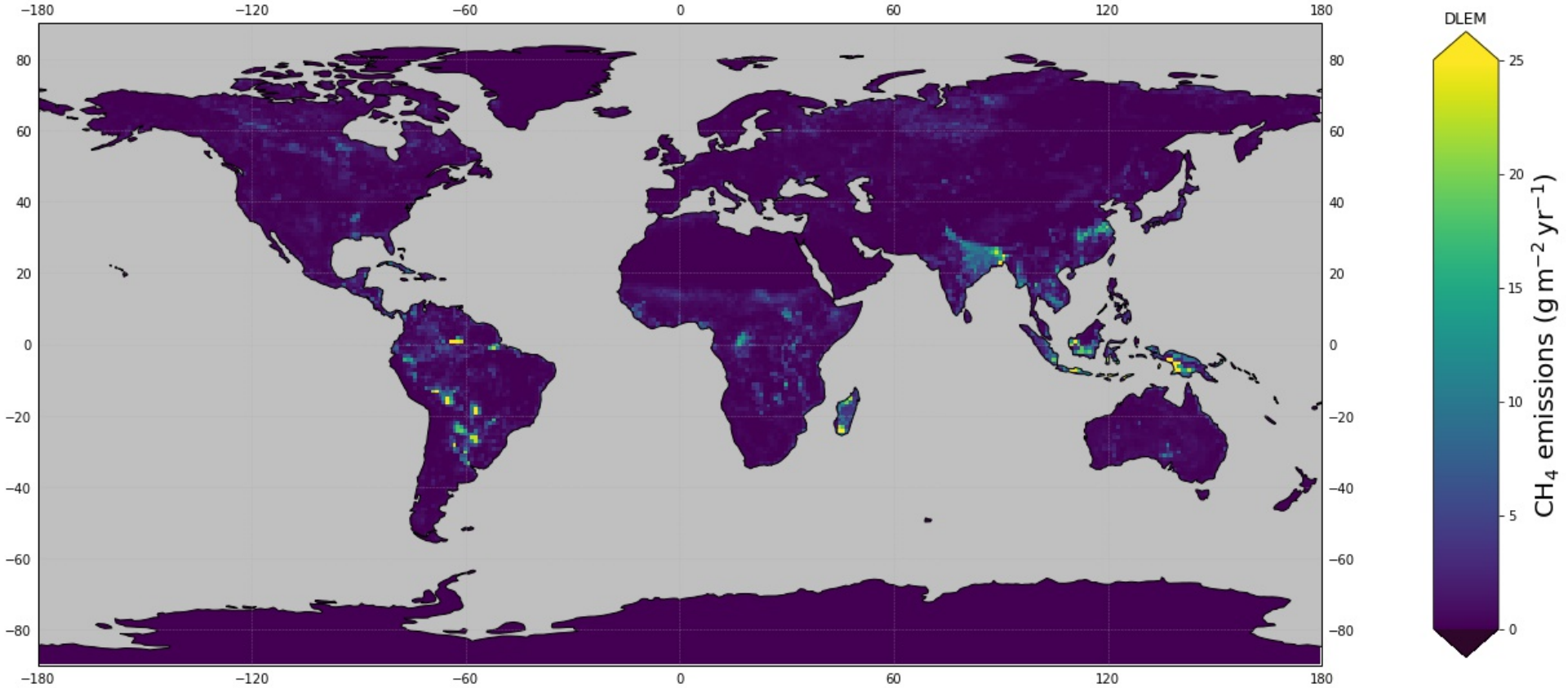

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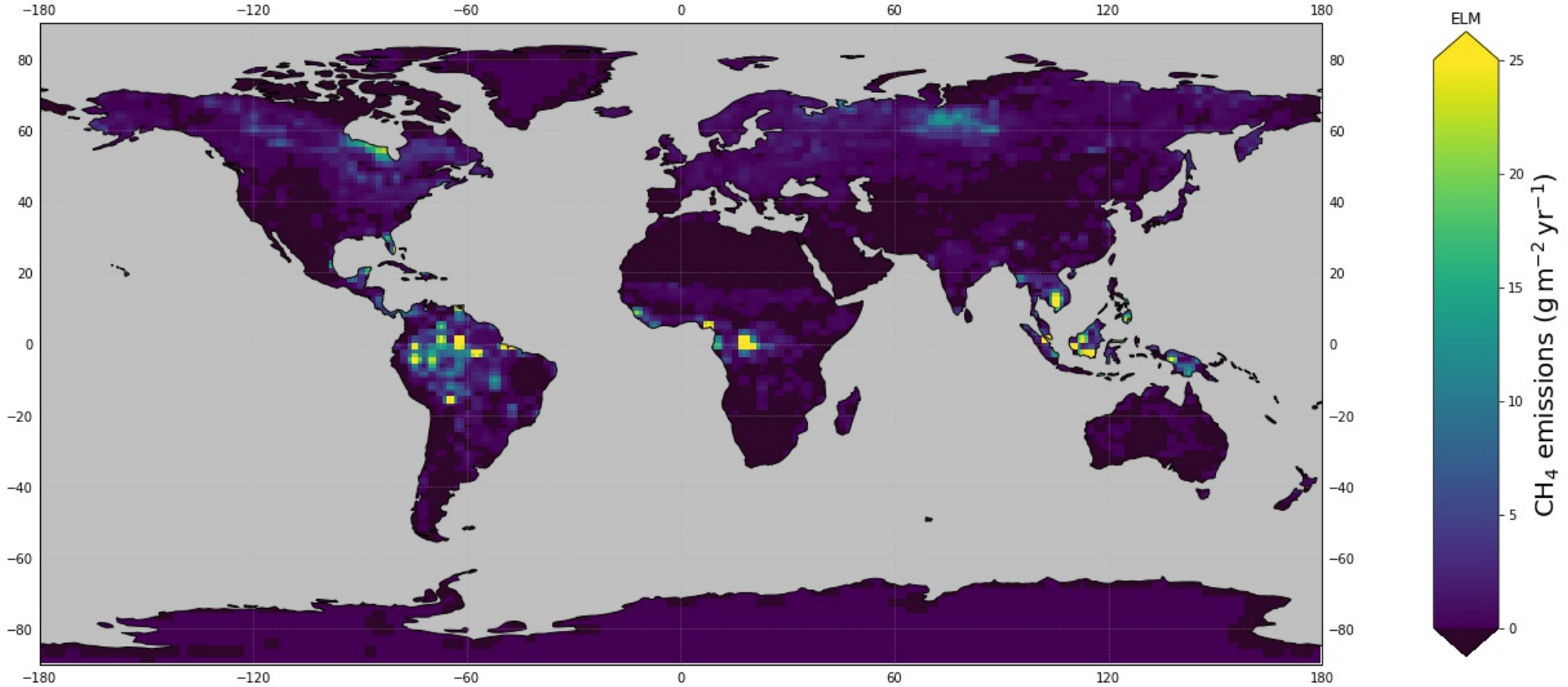

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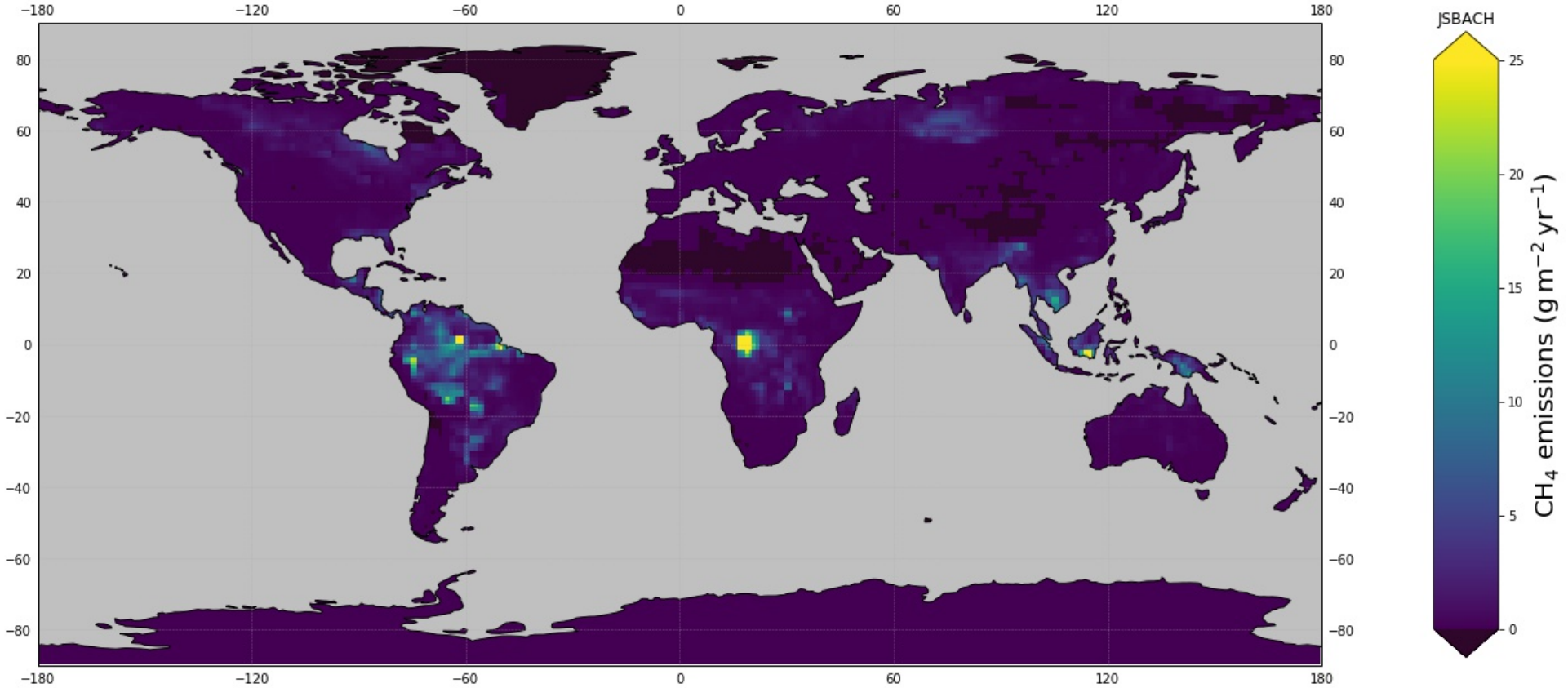

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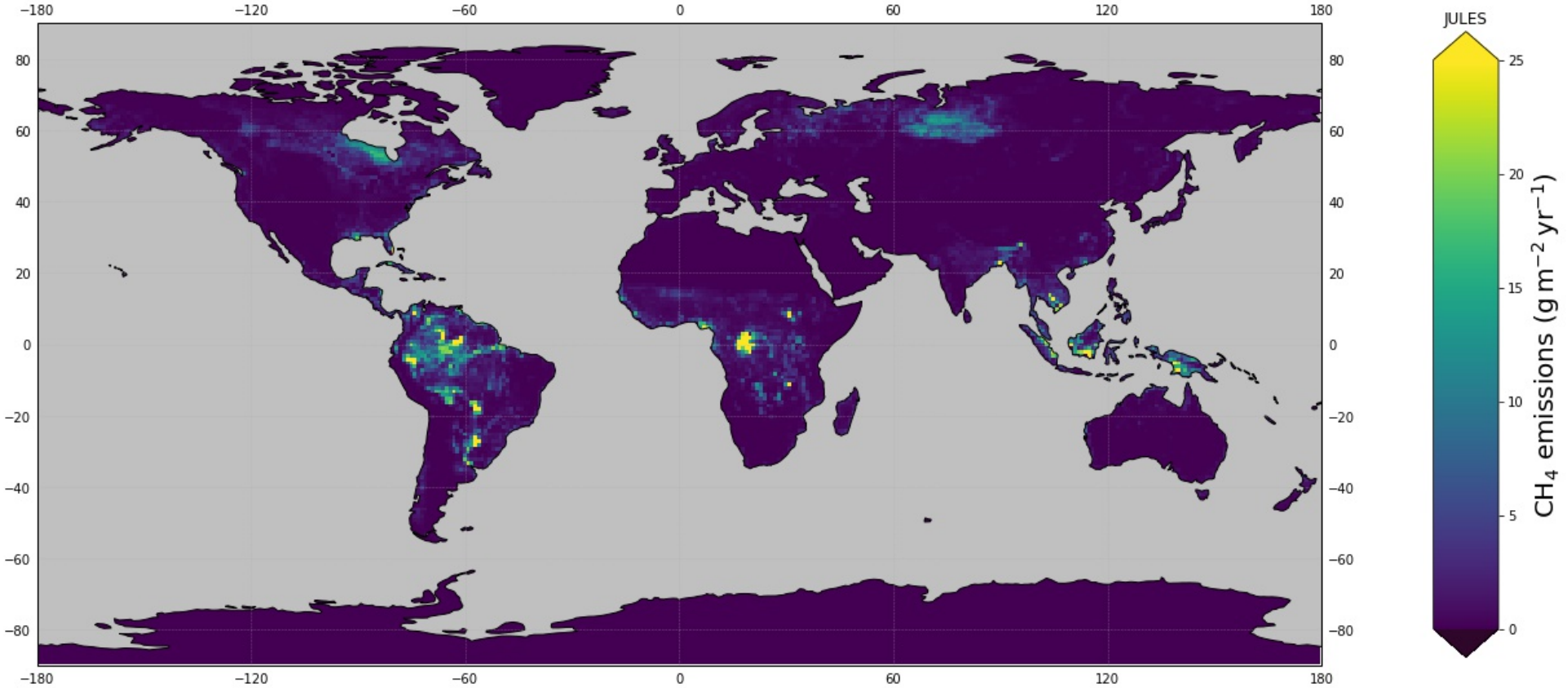

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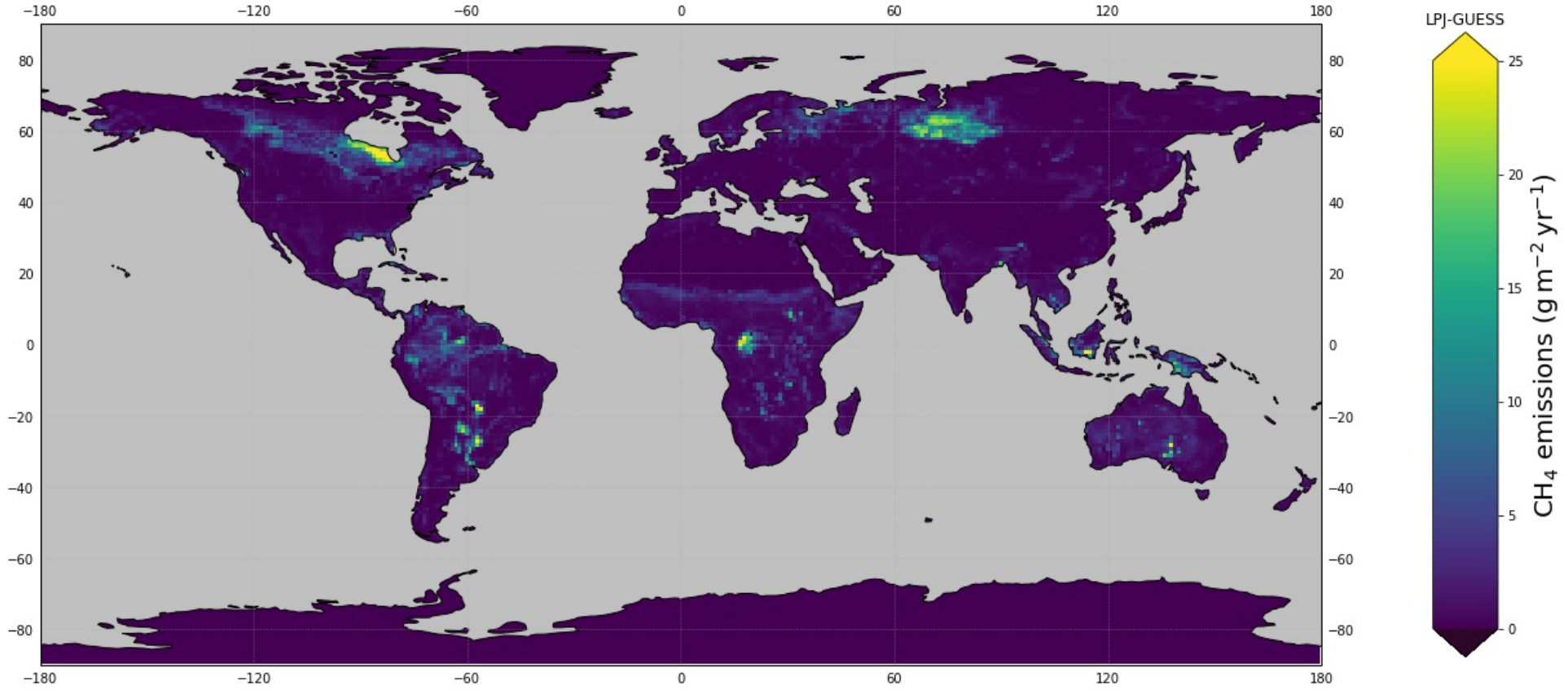

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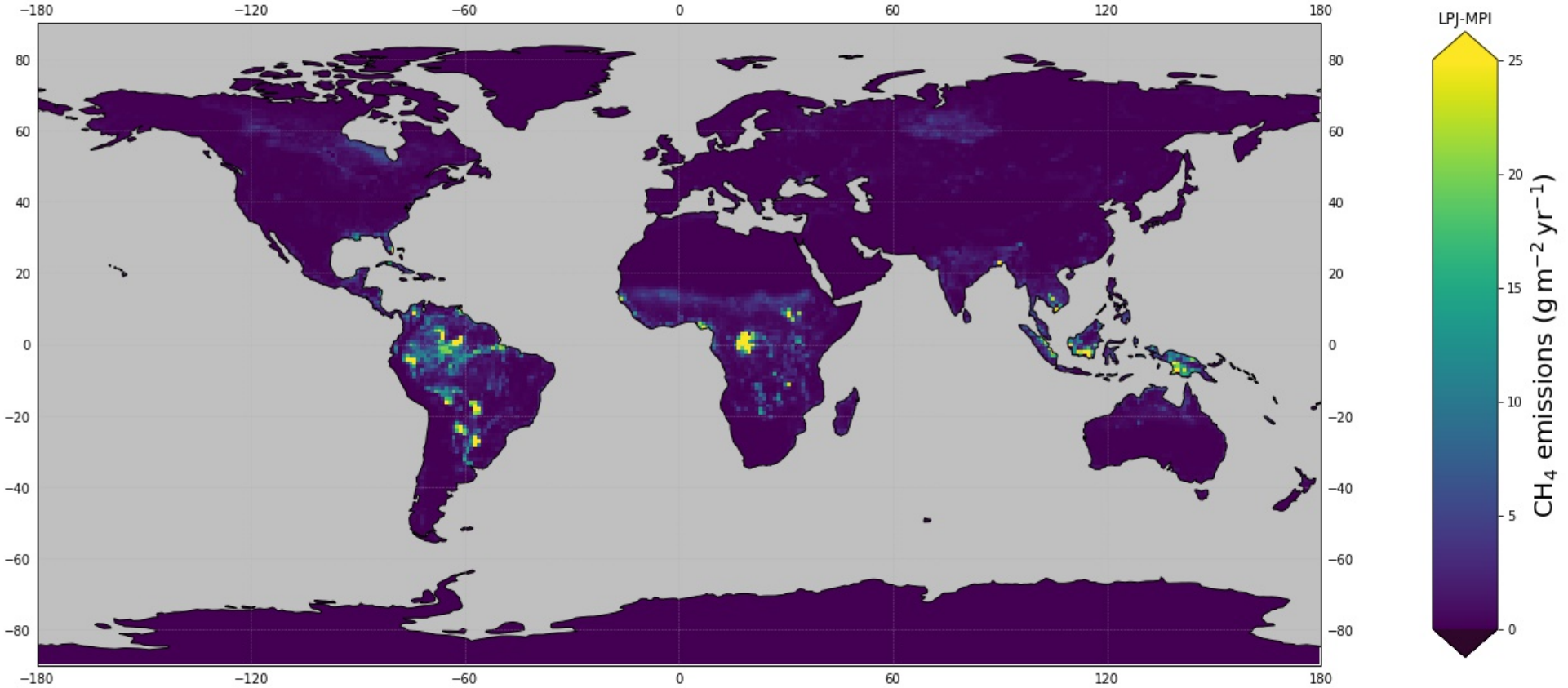

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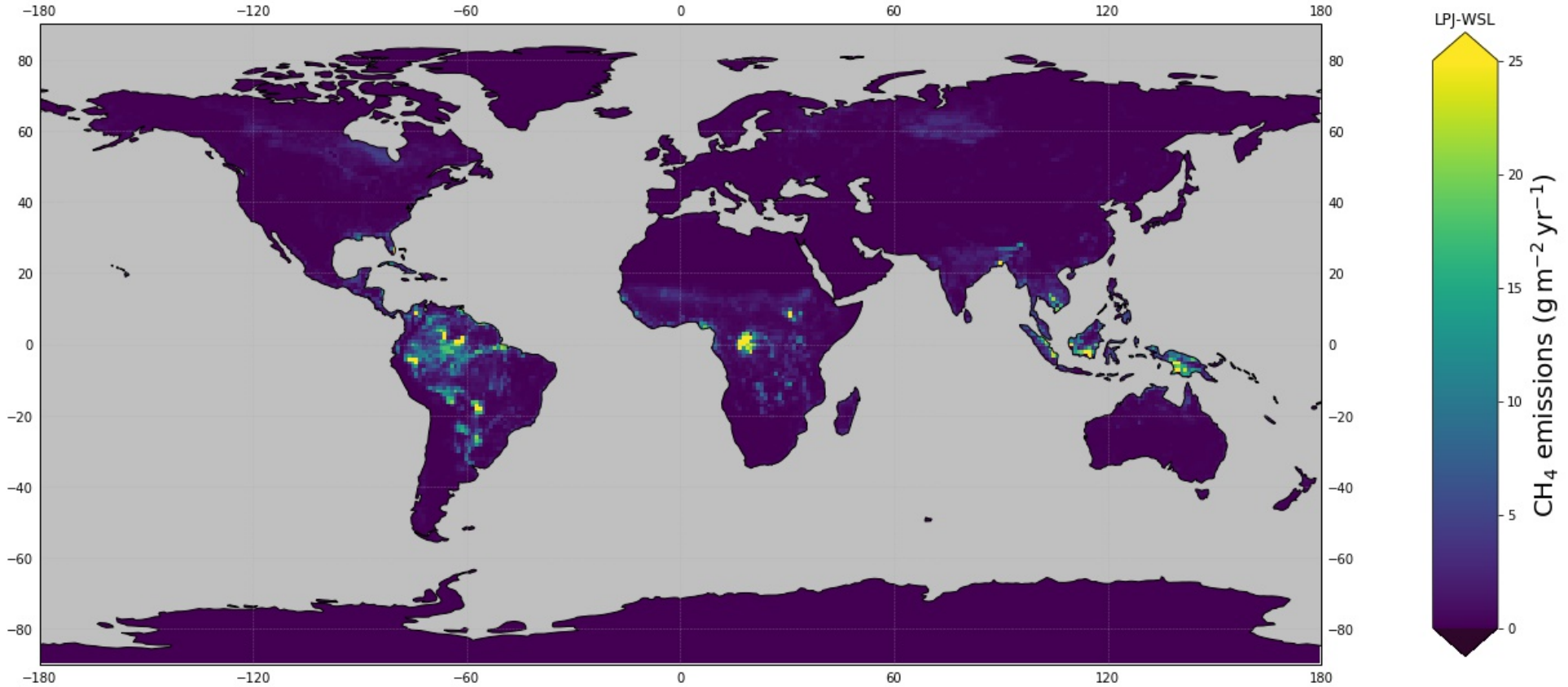

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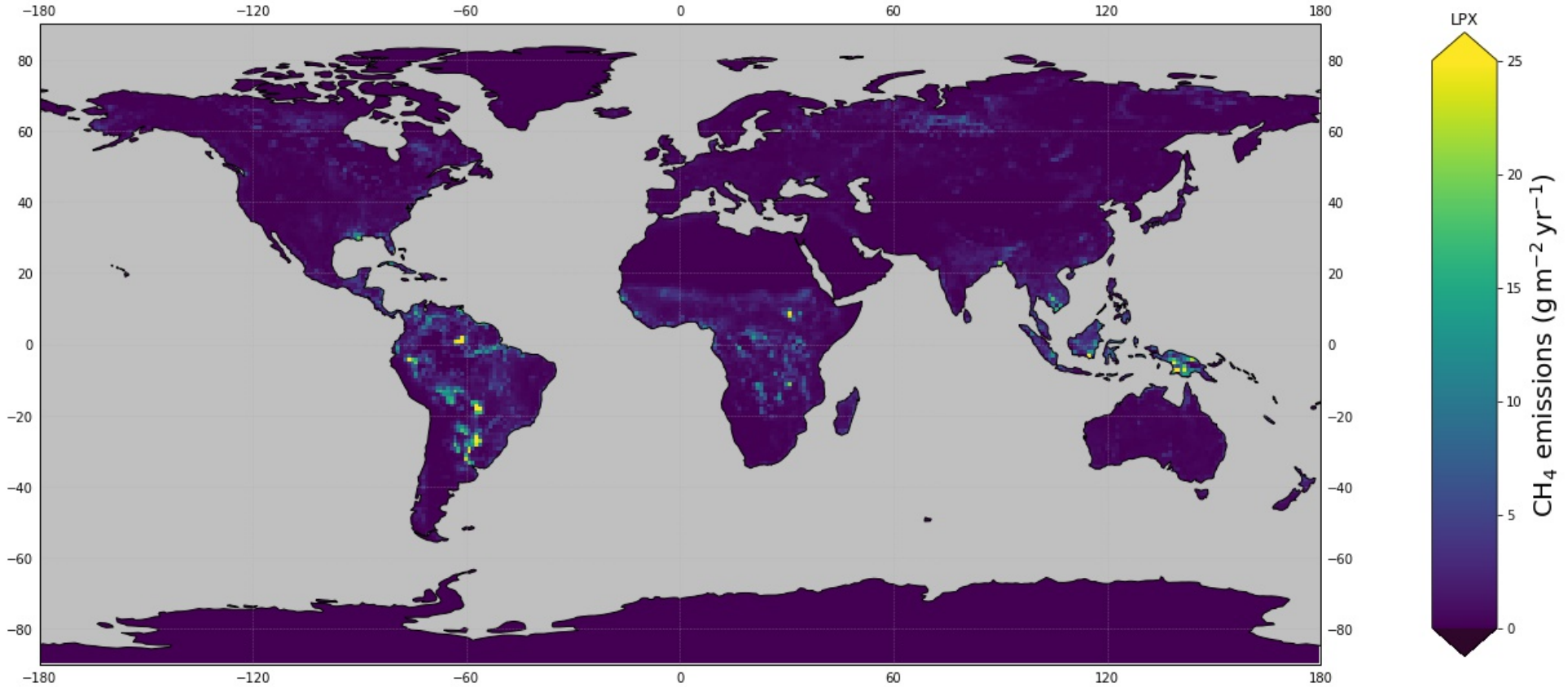

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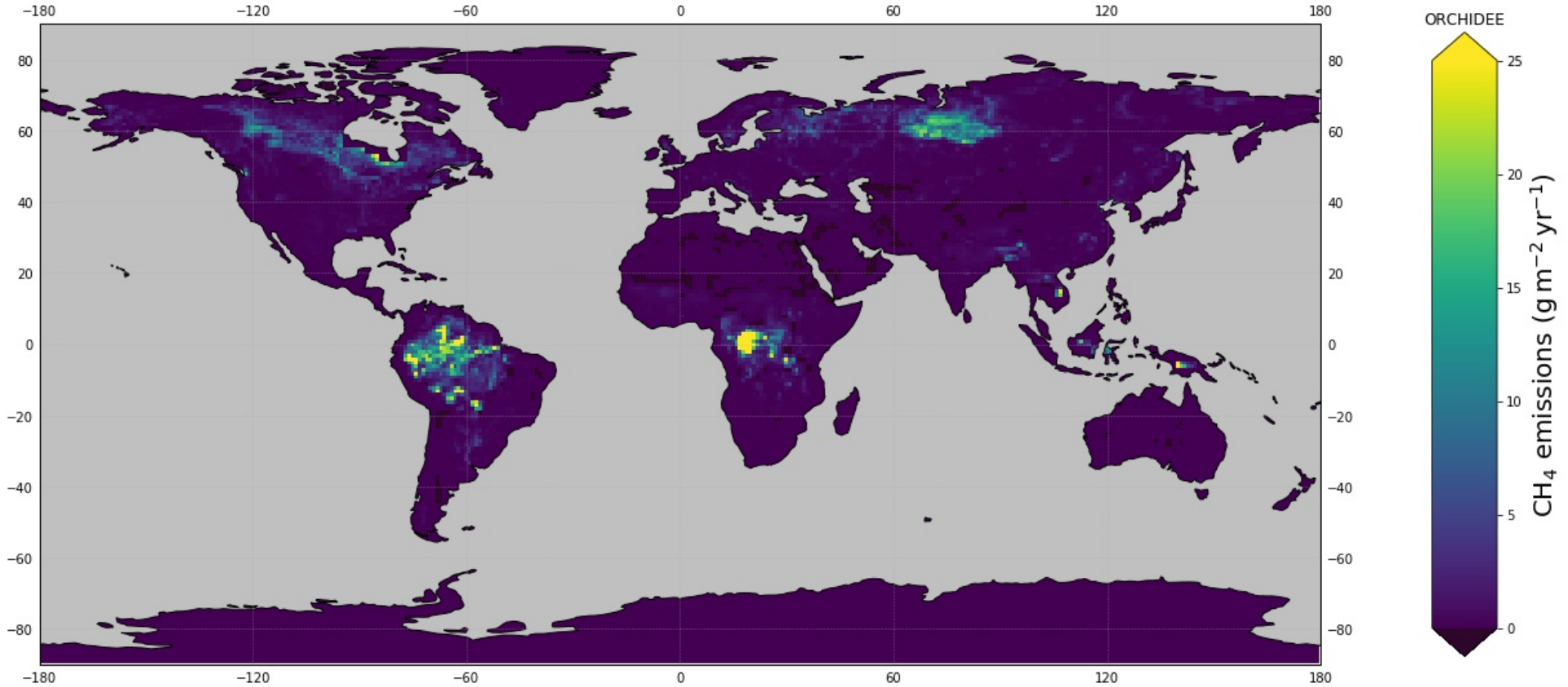

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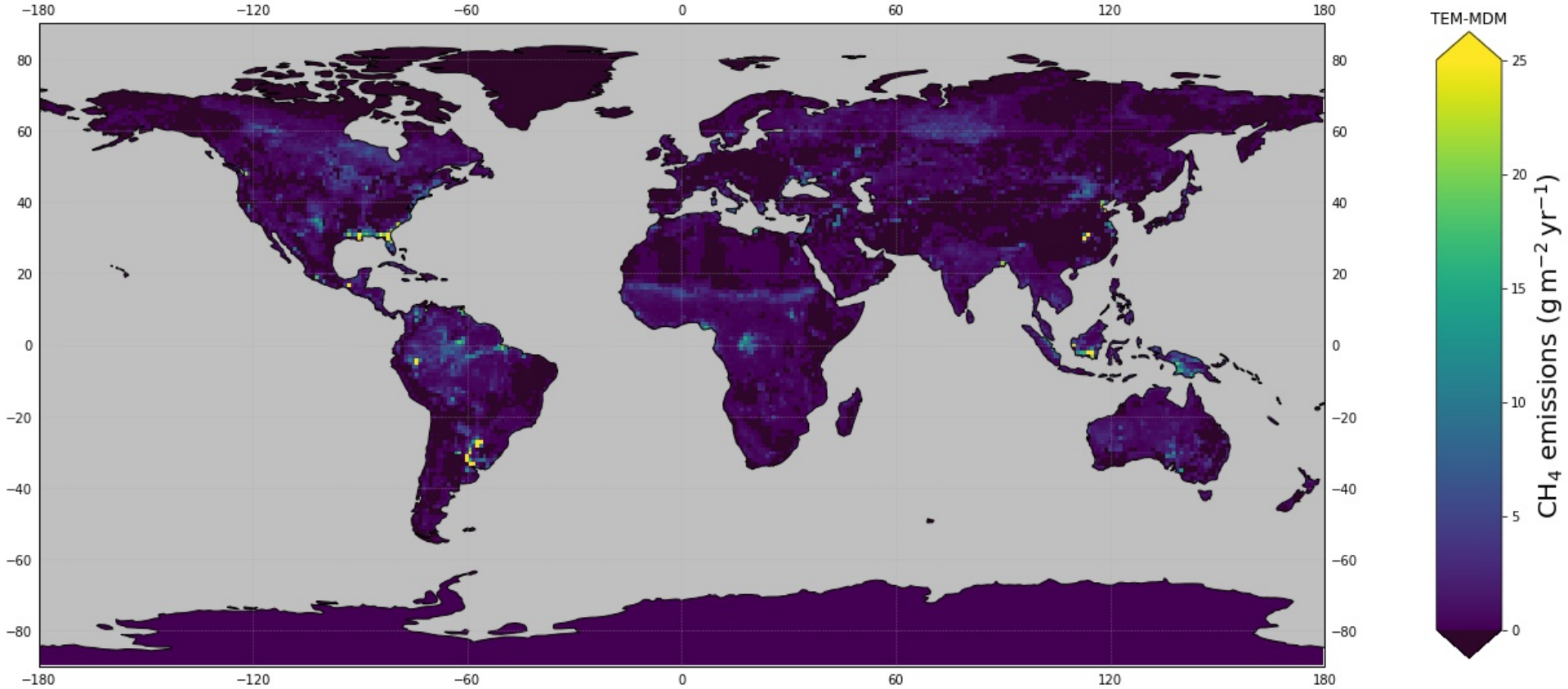

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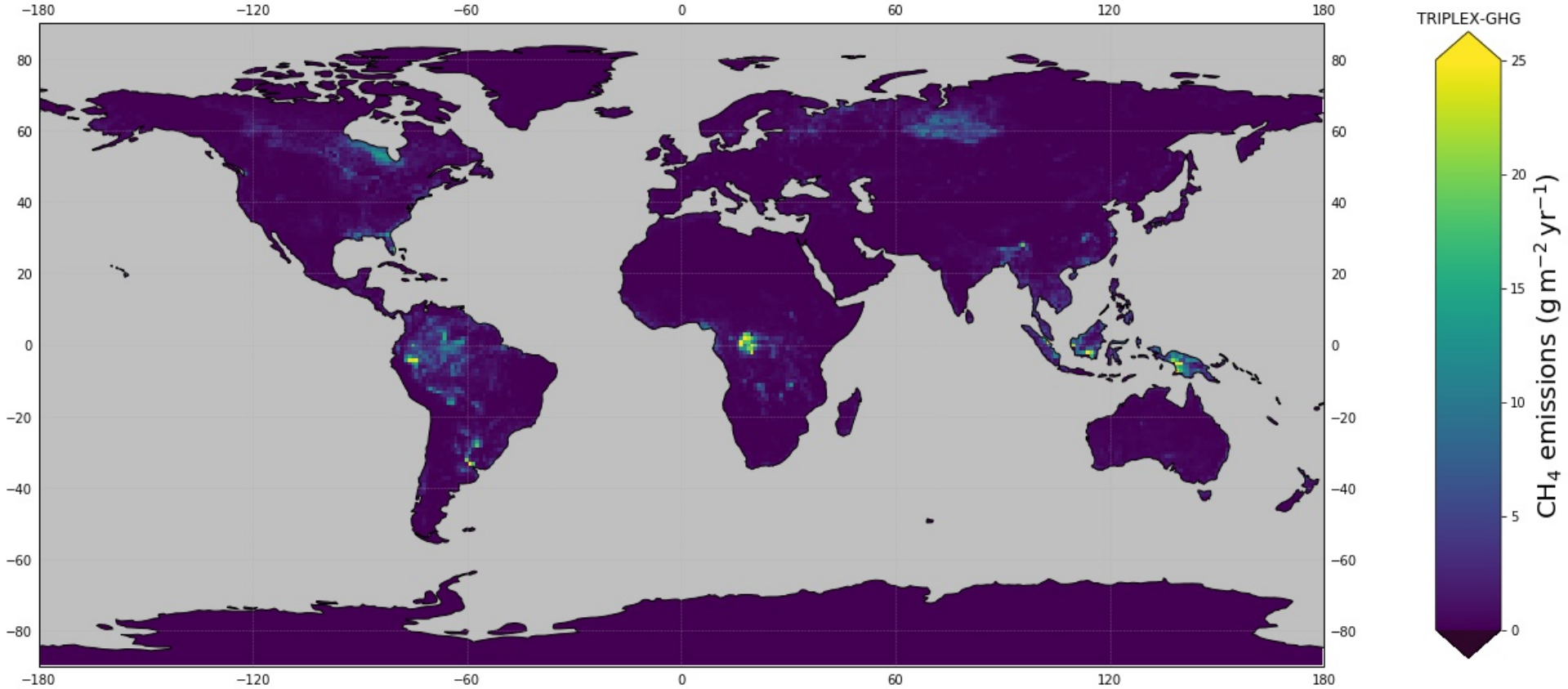

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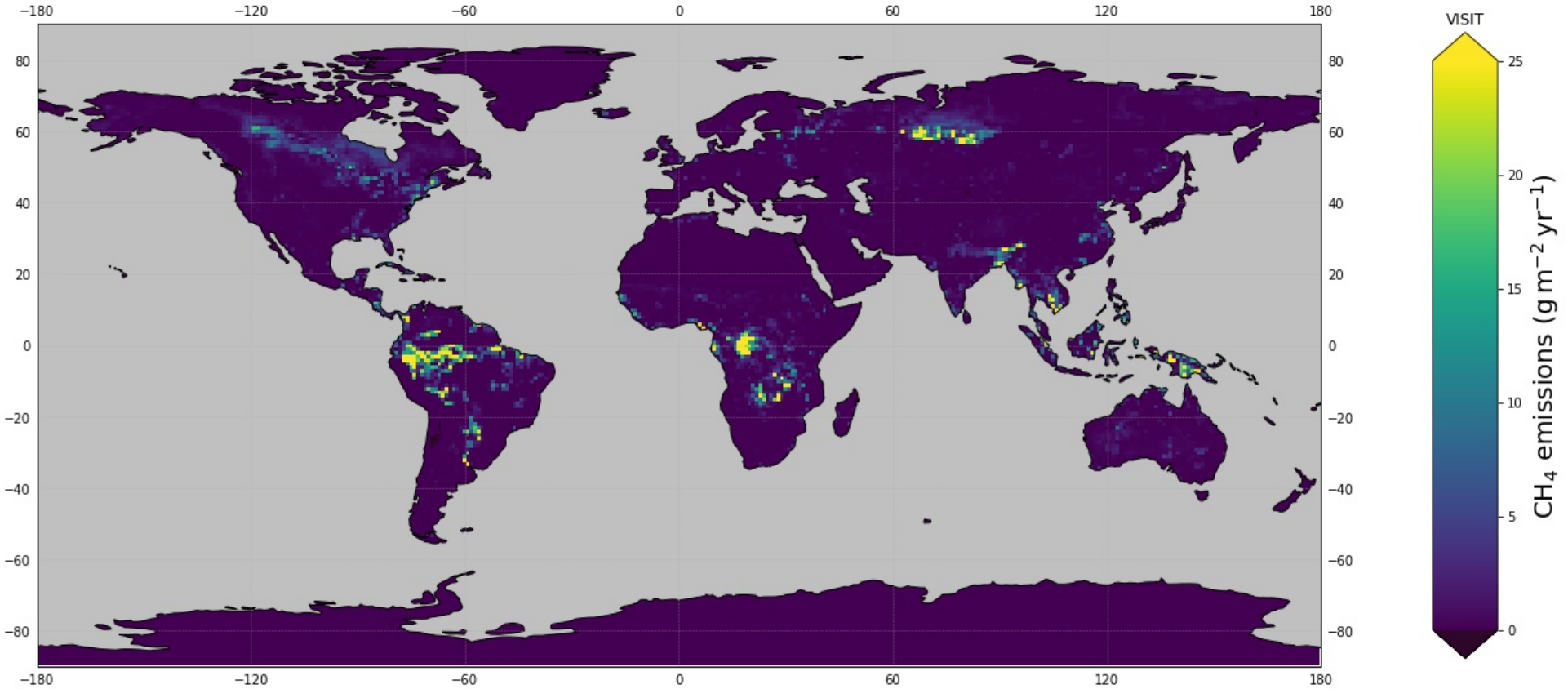
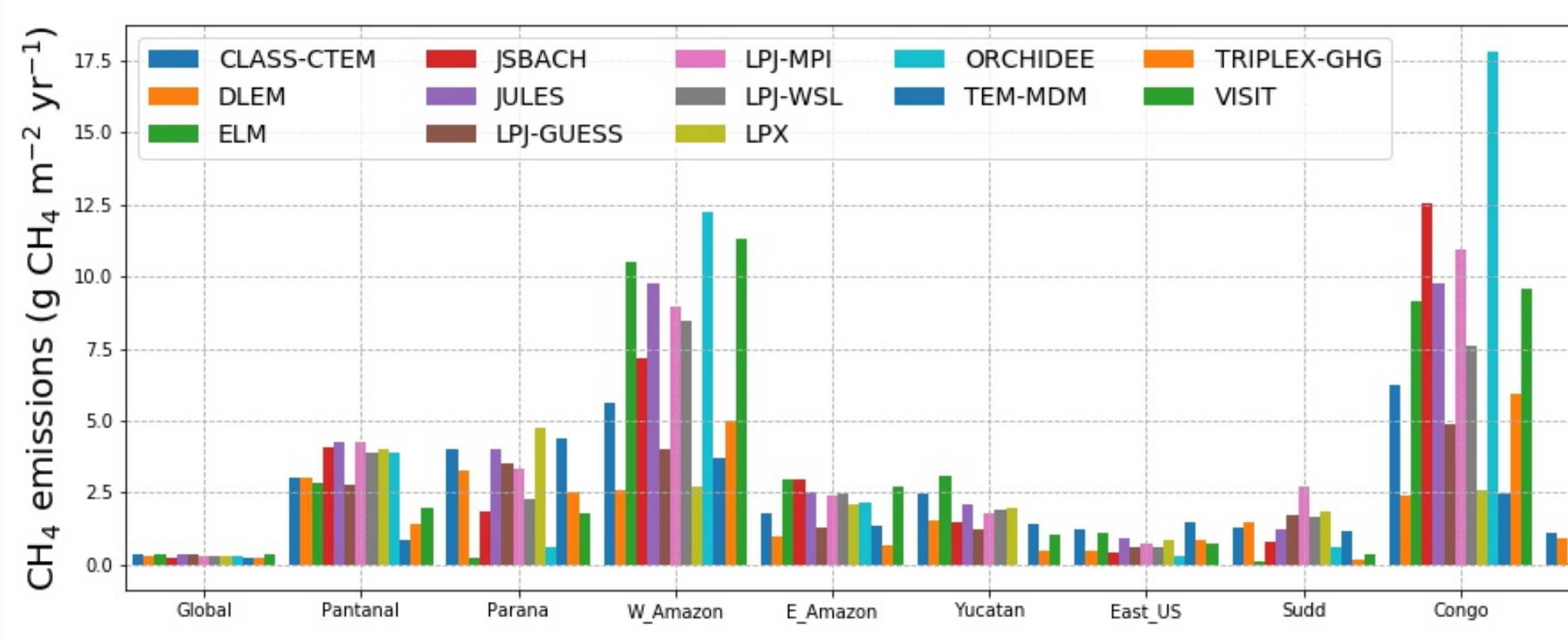


# Wetland $CH_4$ emission datasets

- comparison of regional wetland emissions



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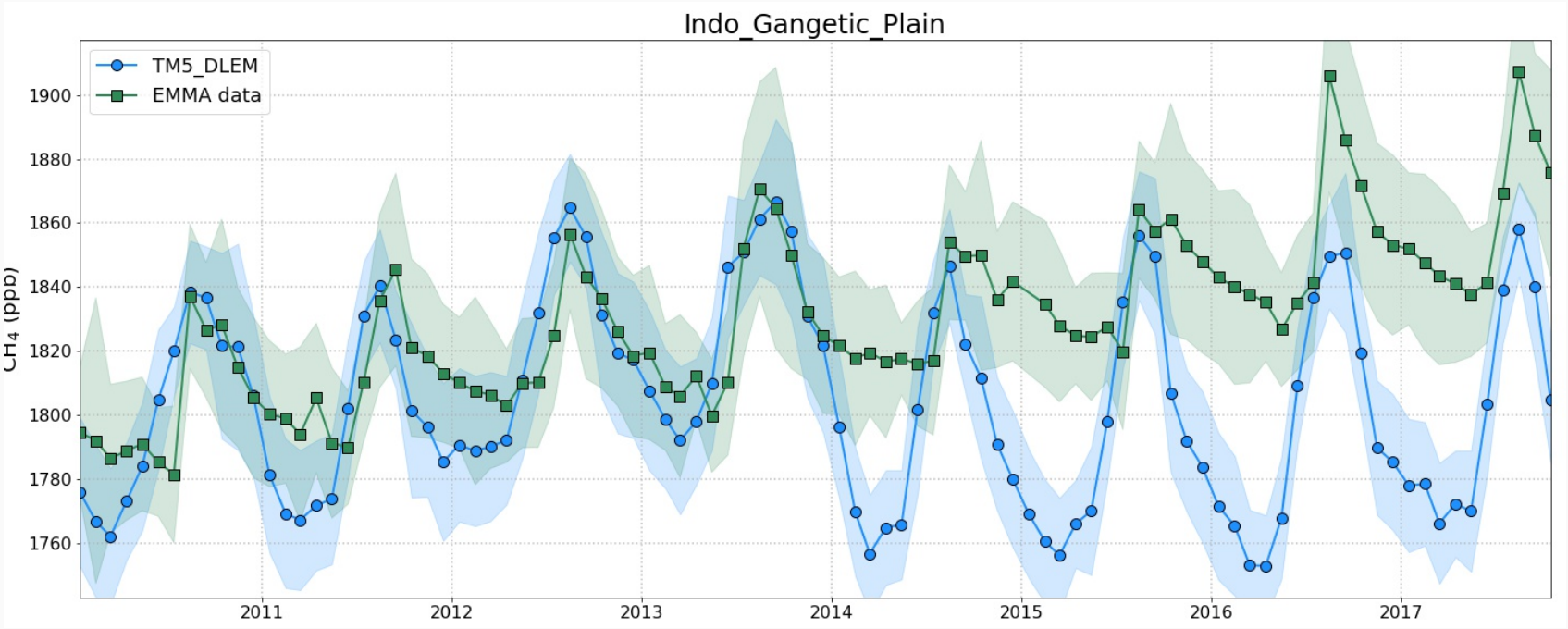

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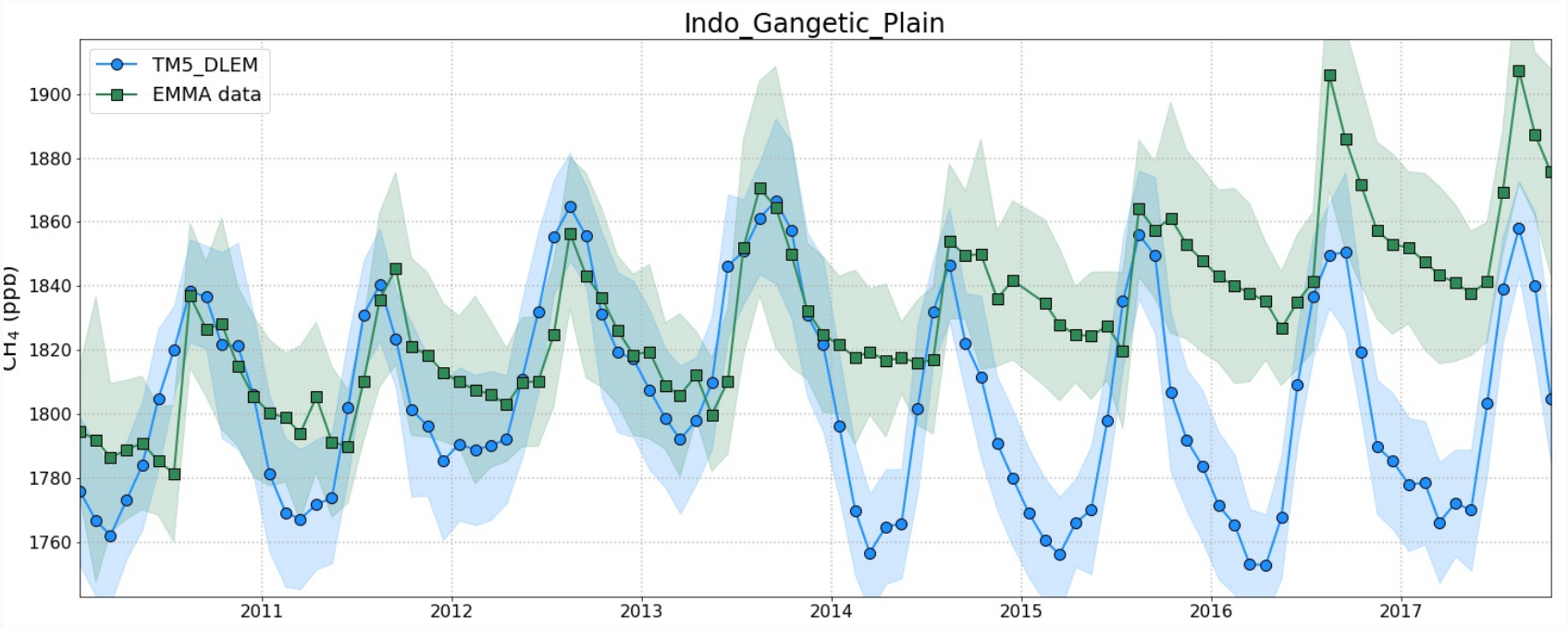
- deviation from satellite data starting 2014



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- comparison of modeled $CH_4$ with satellite data
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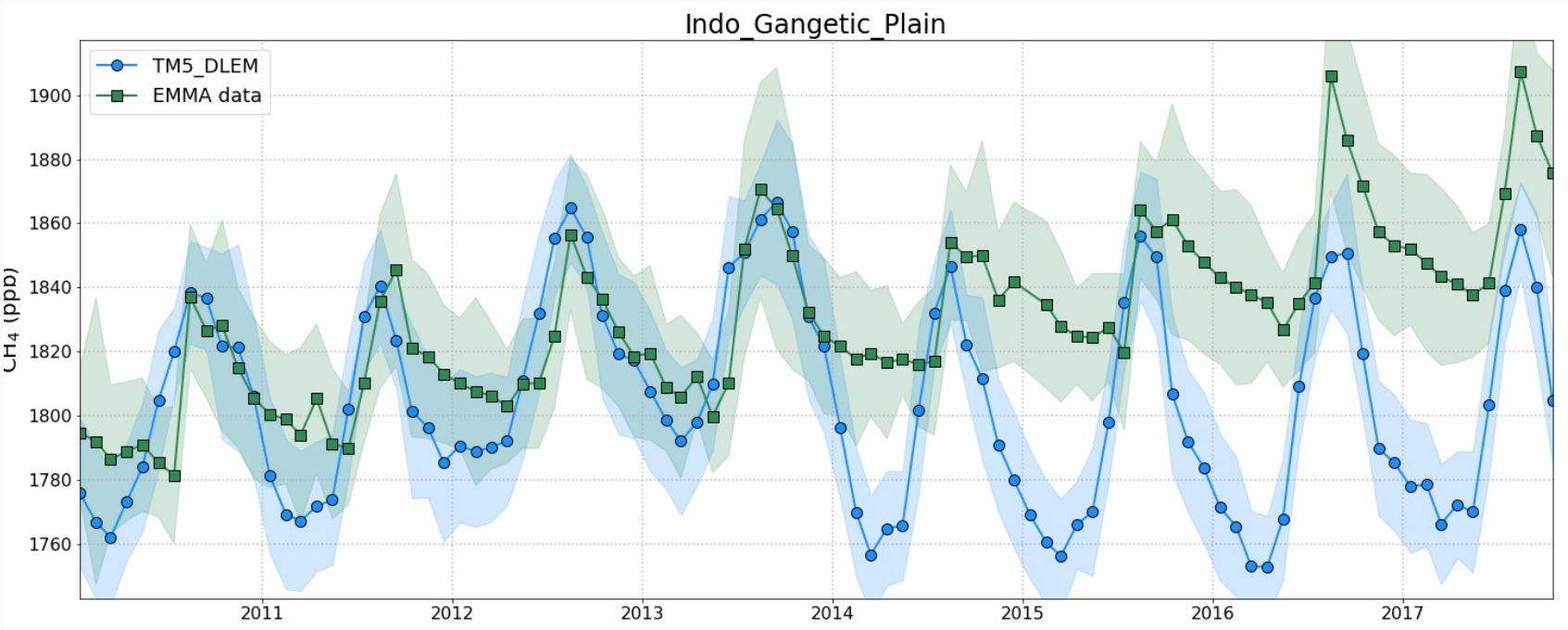
  but reasonable seasonality



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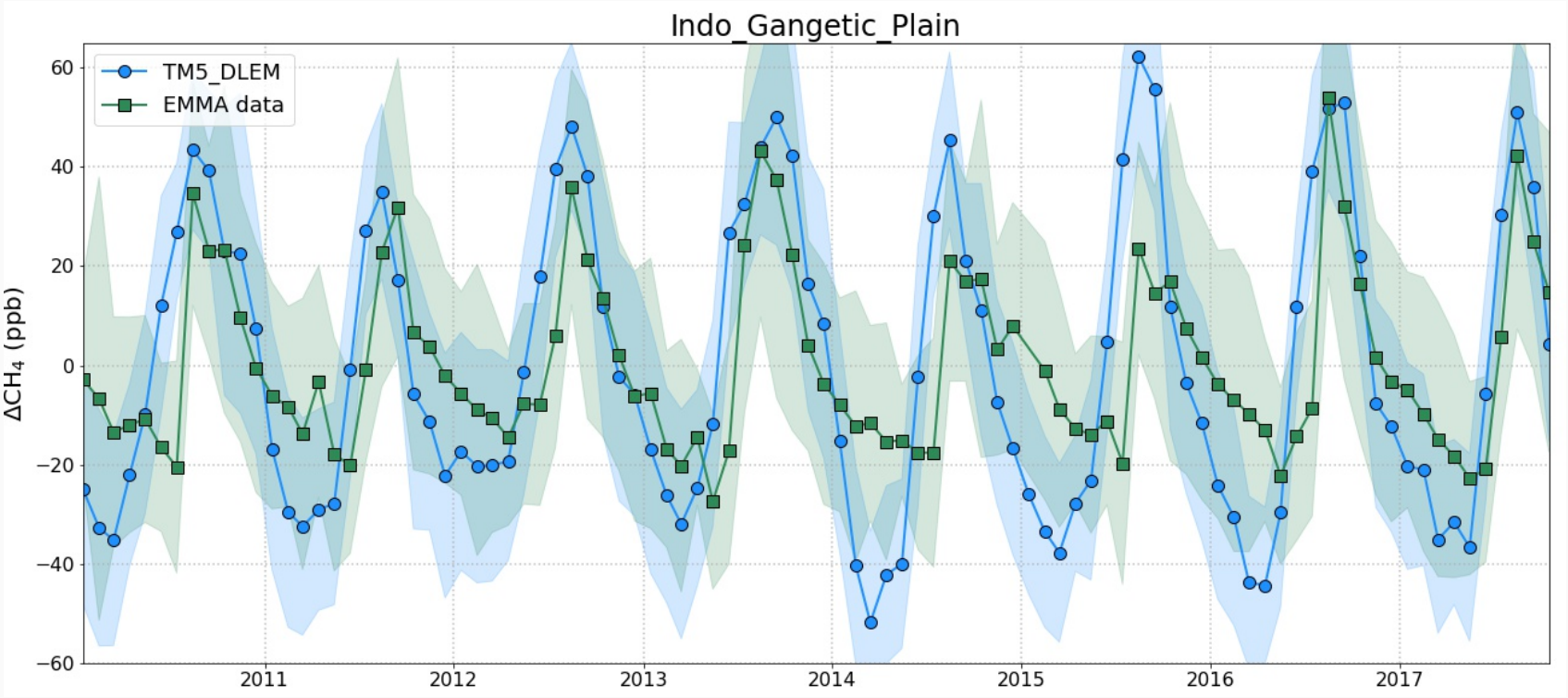

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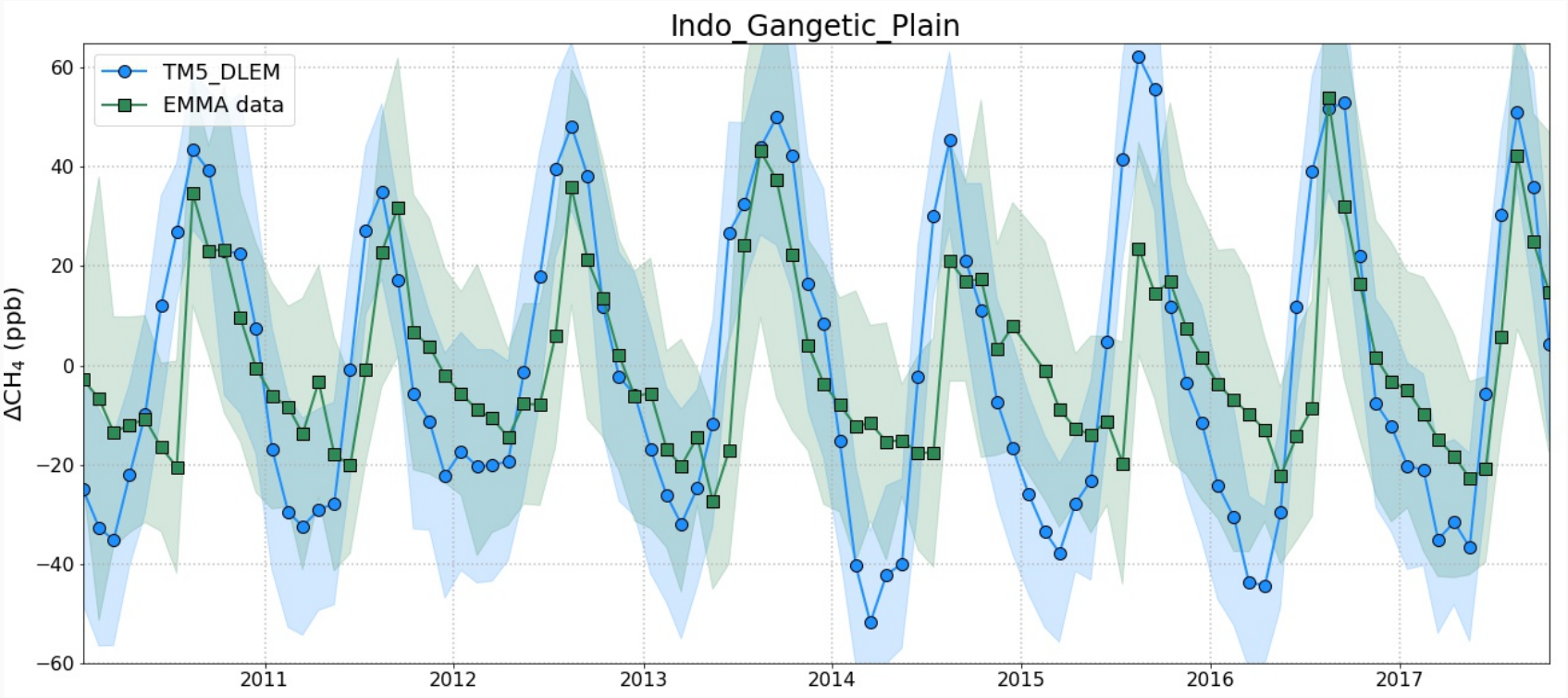

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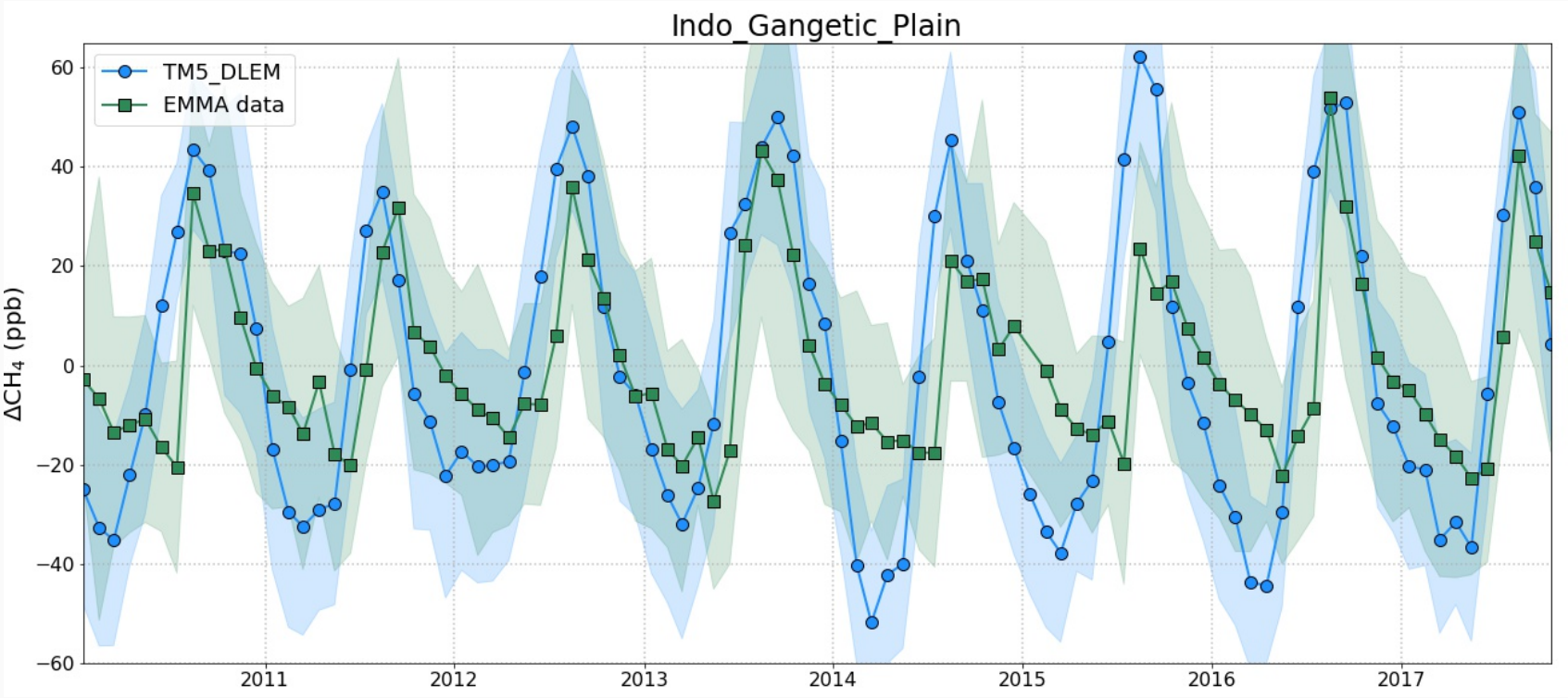
- no quantitative results possible



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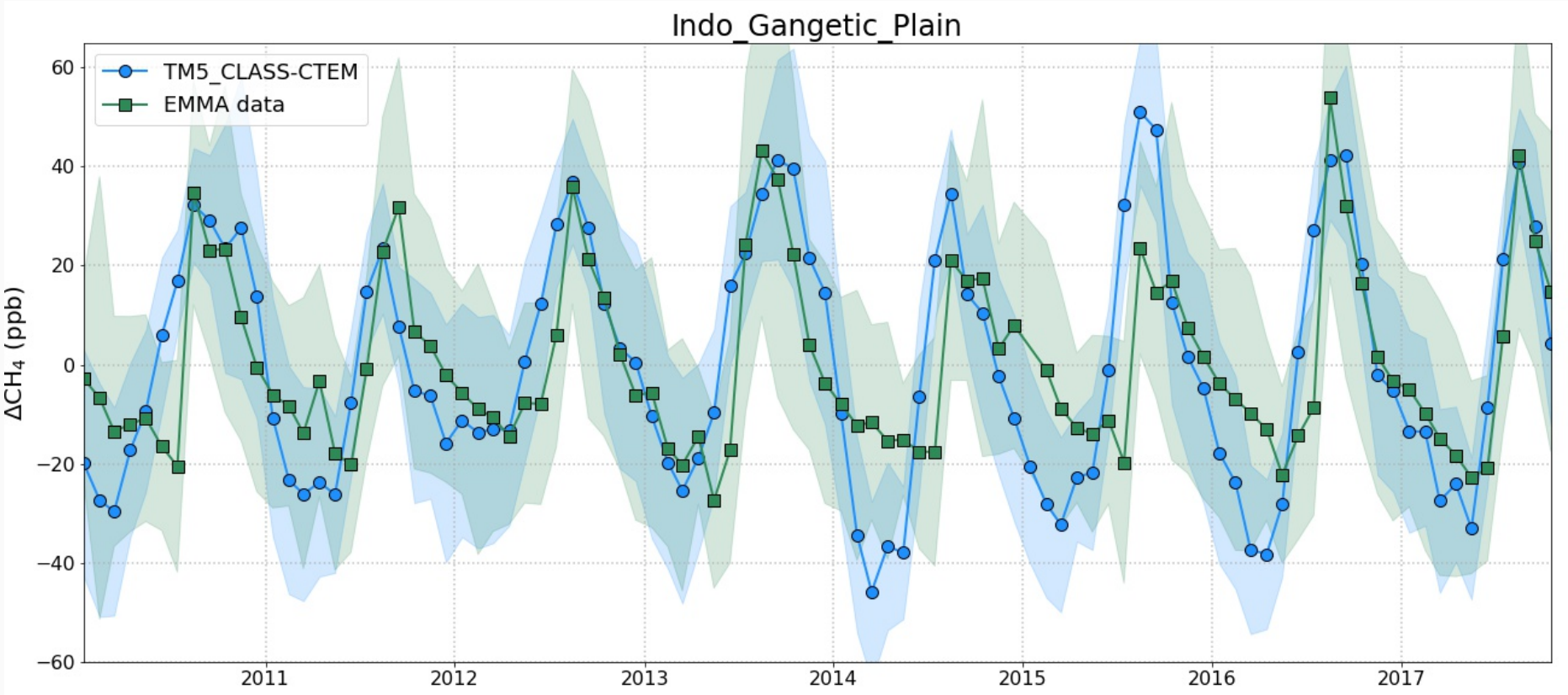

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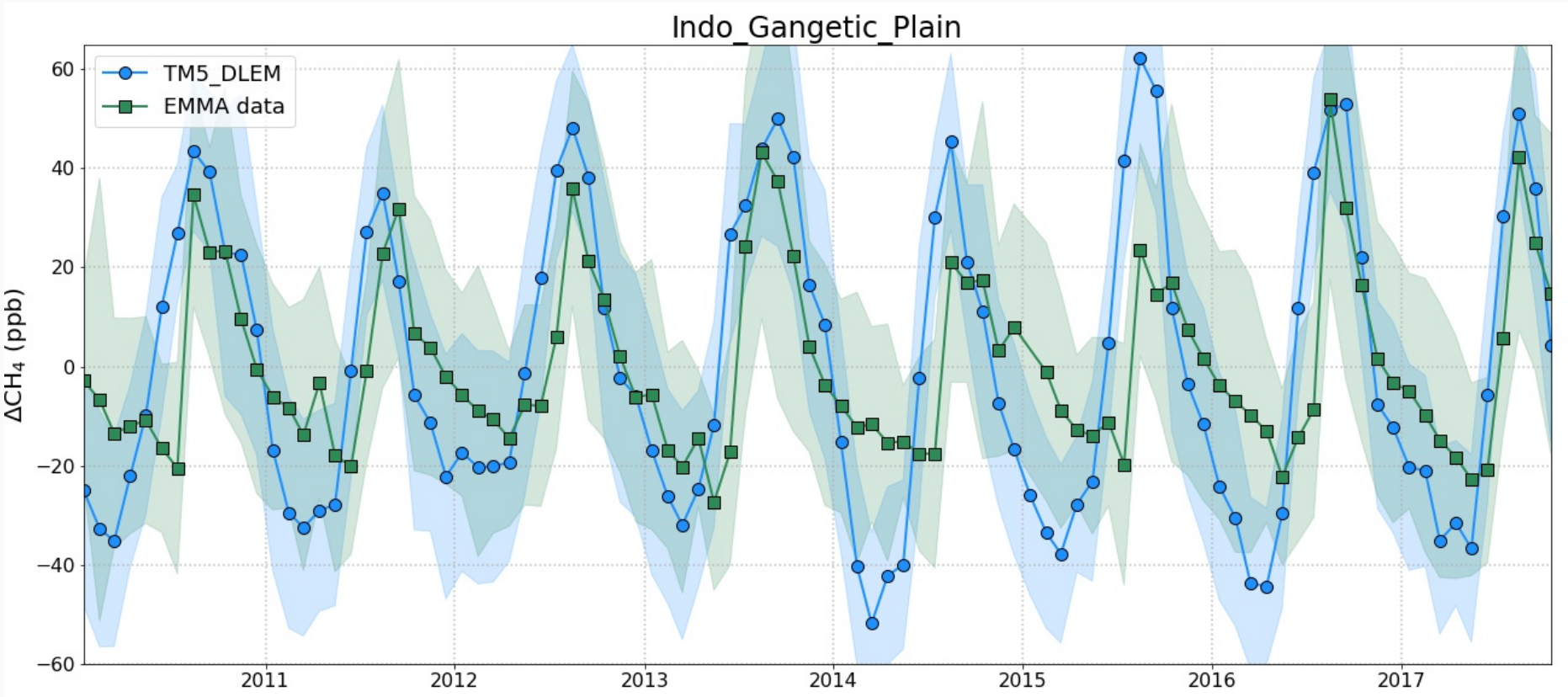

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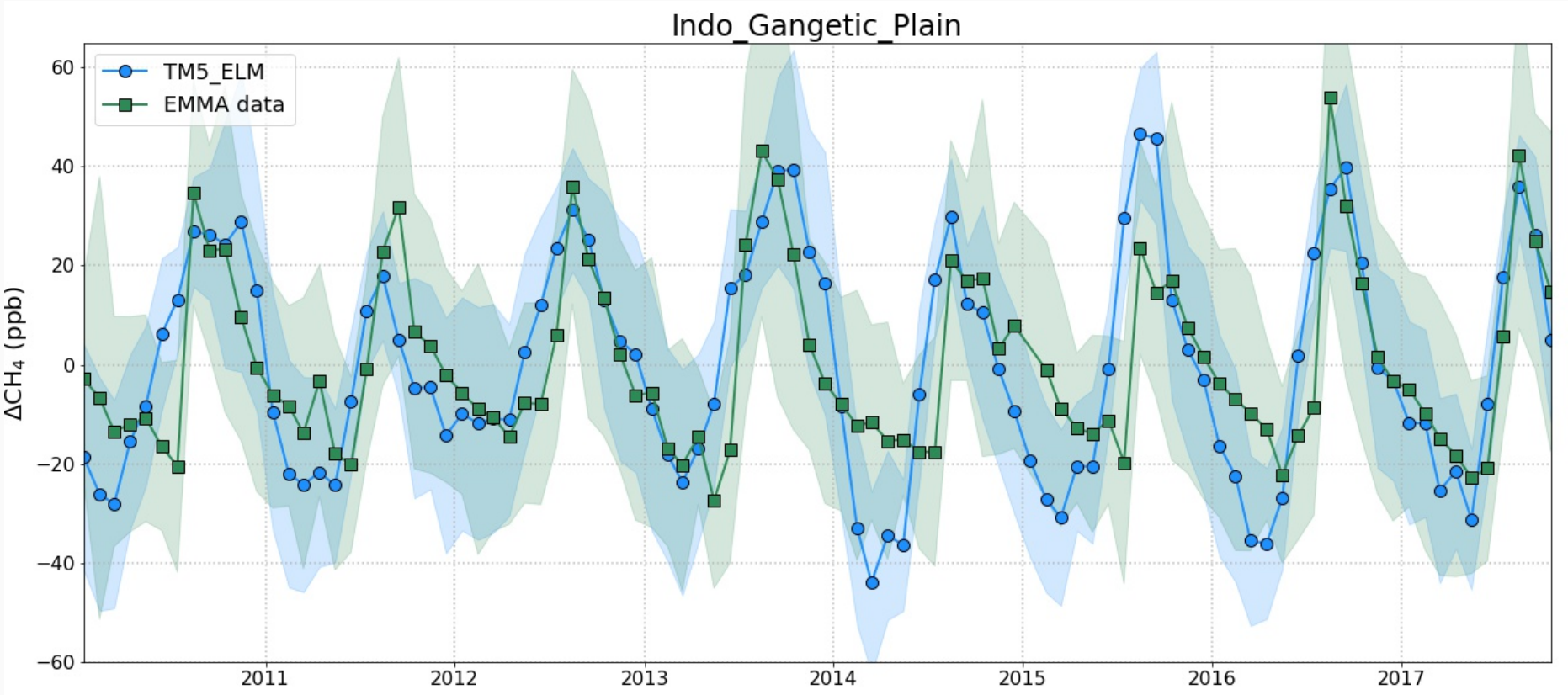

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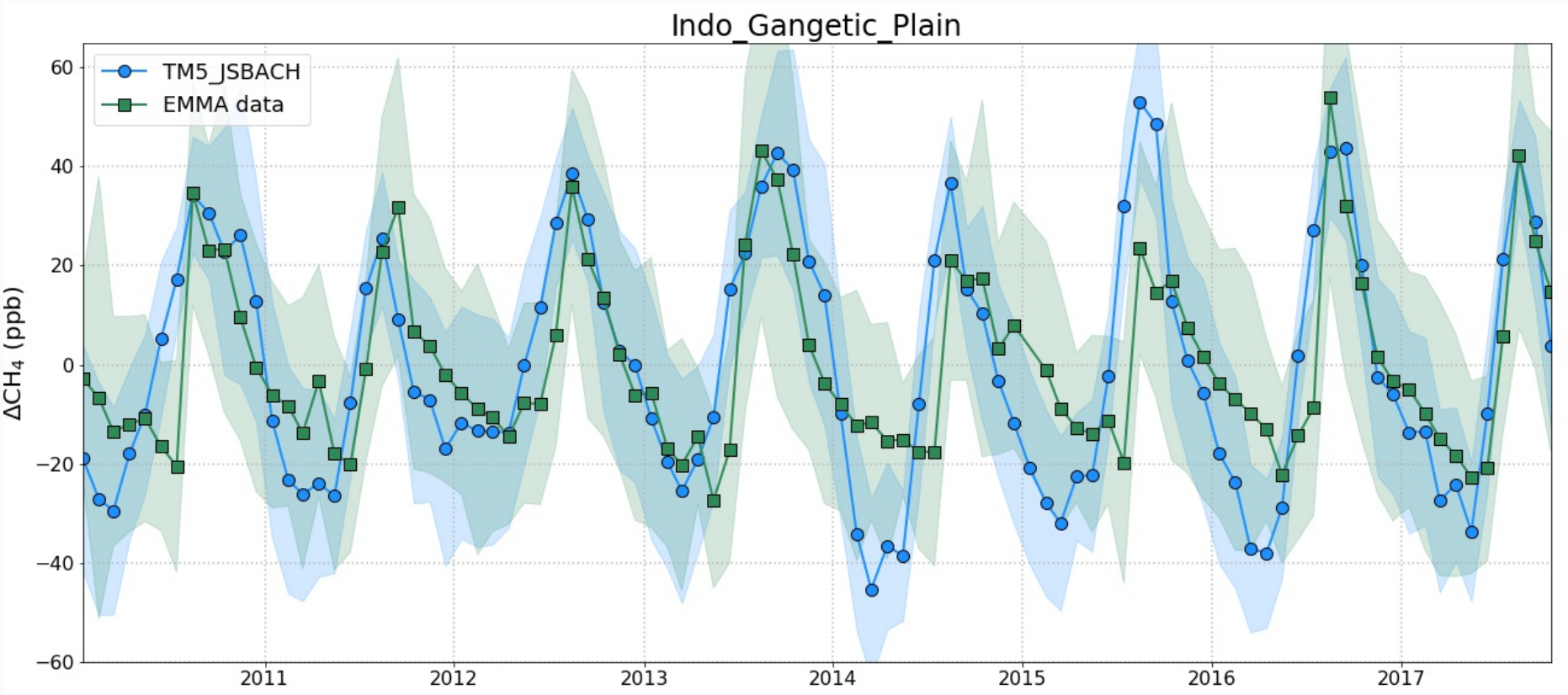

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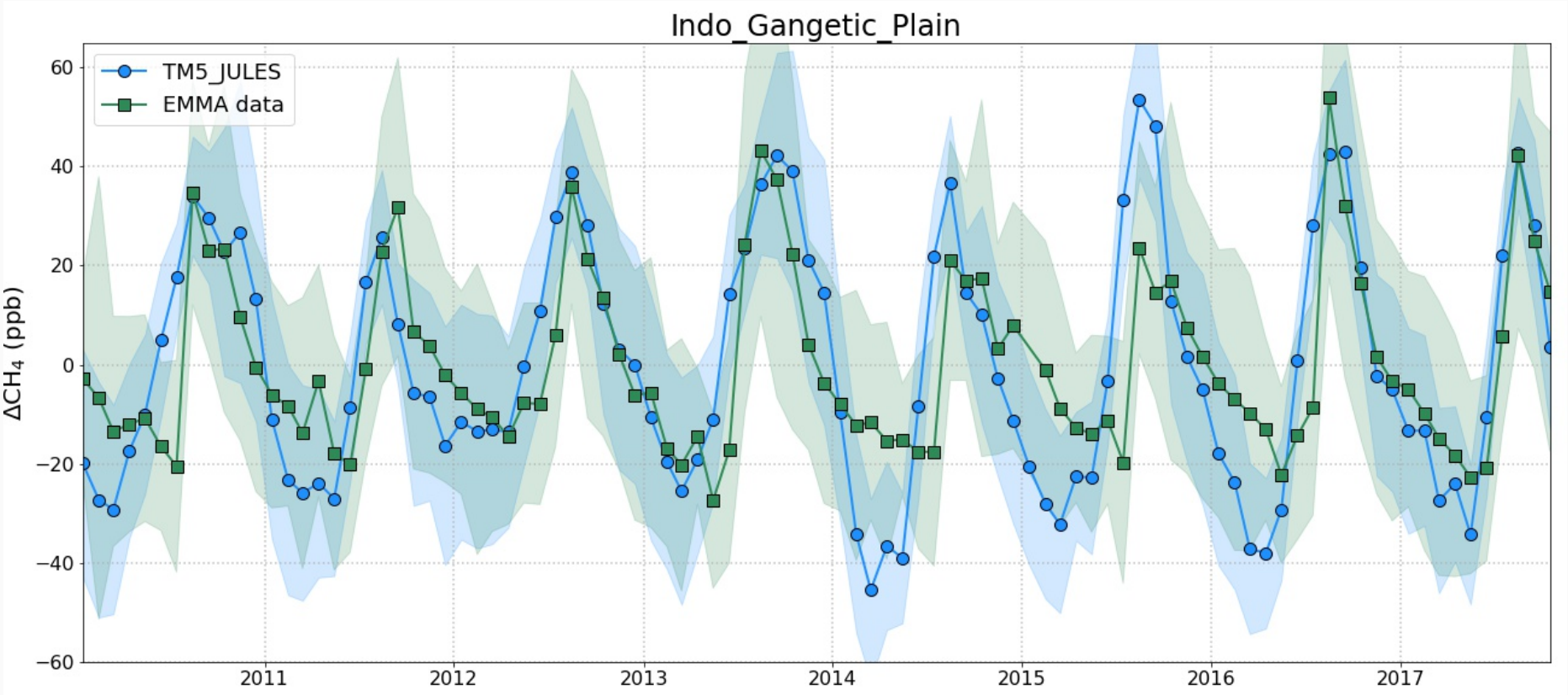

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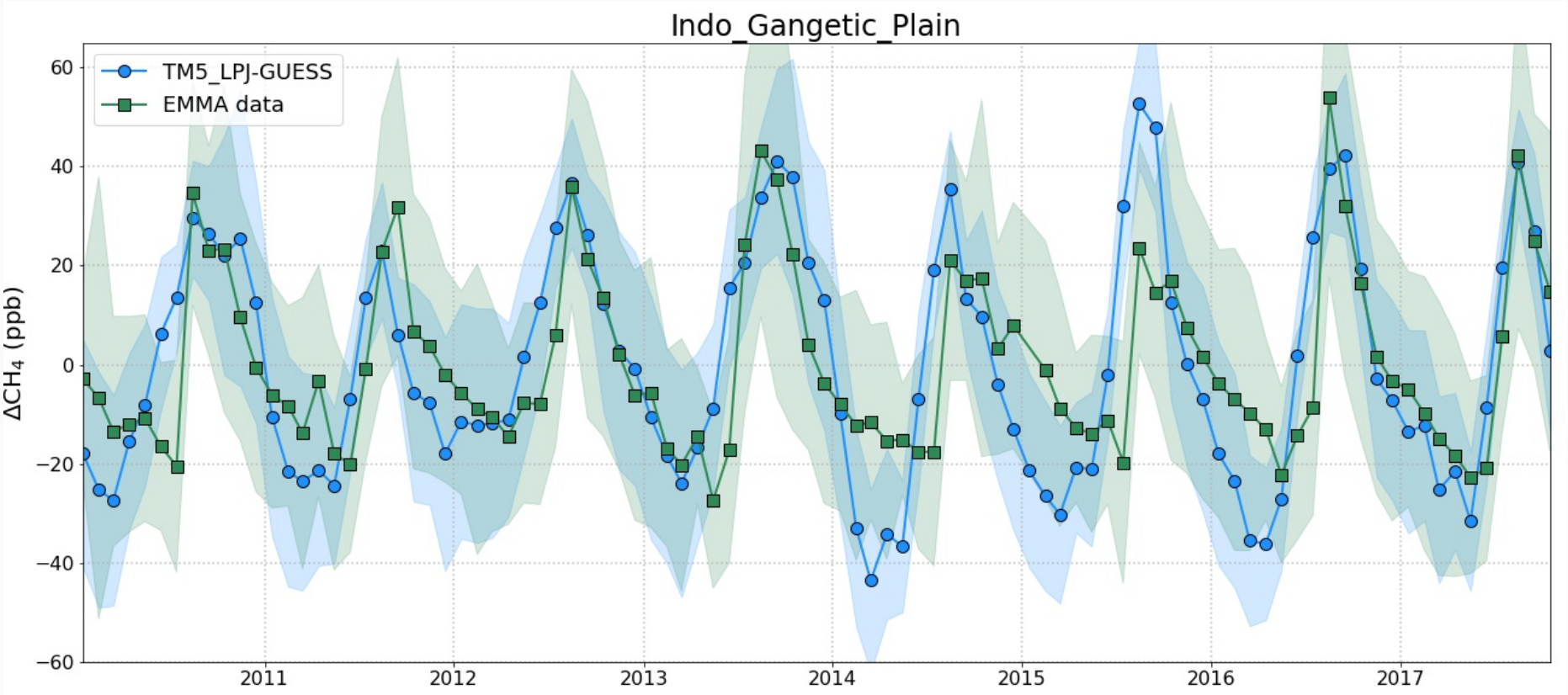

# Implementation of data in TM5

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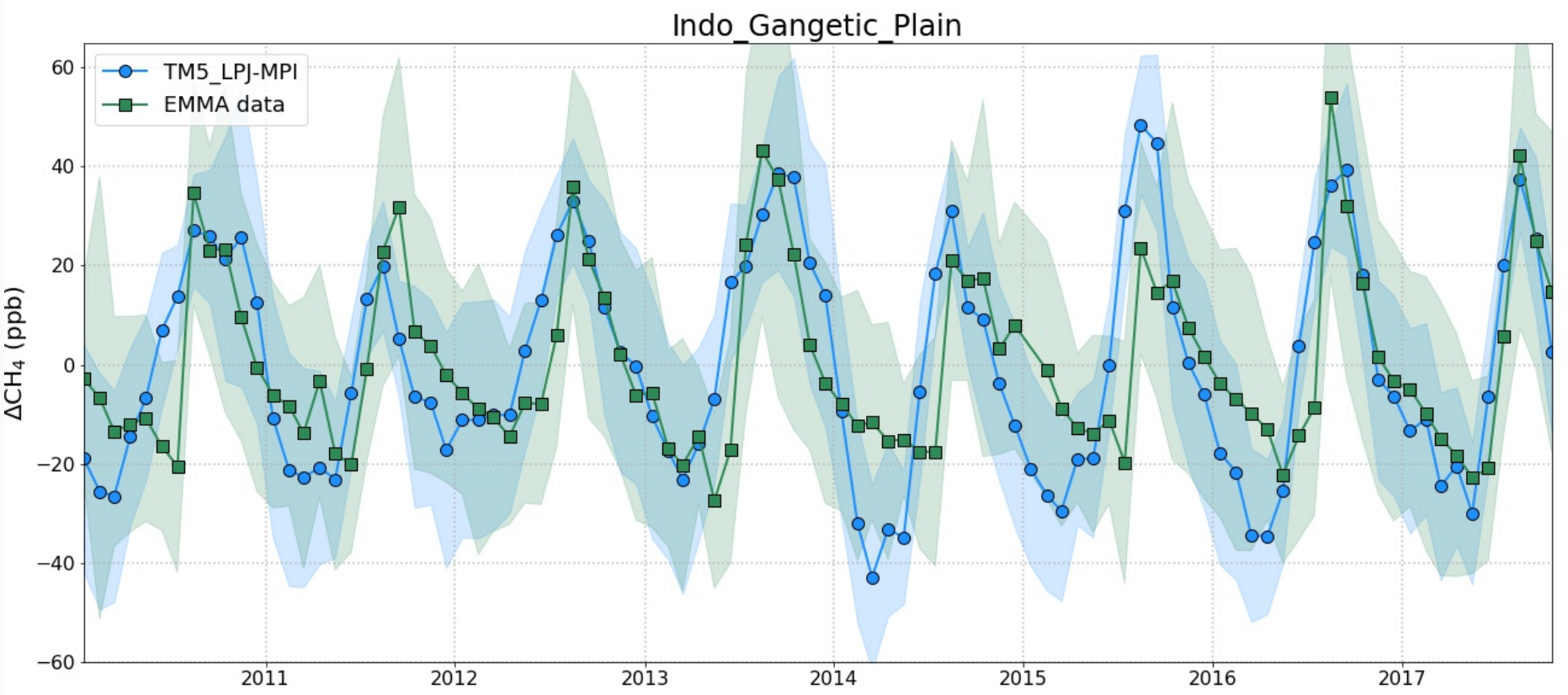

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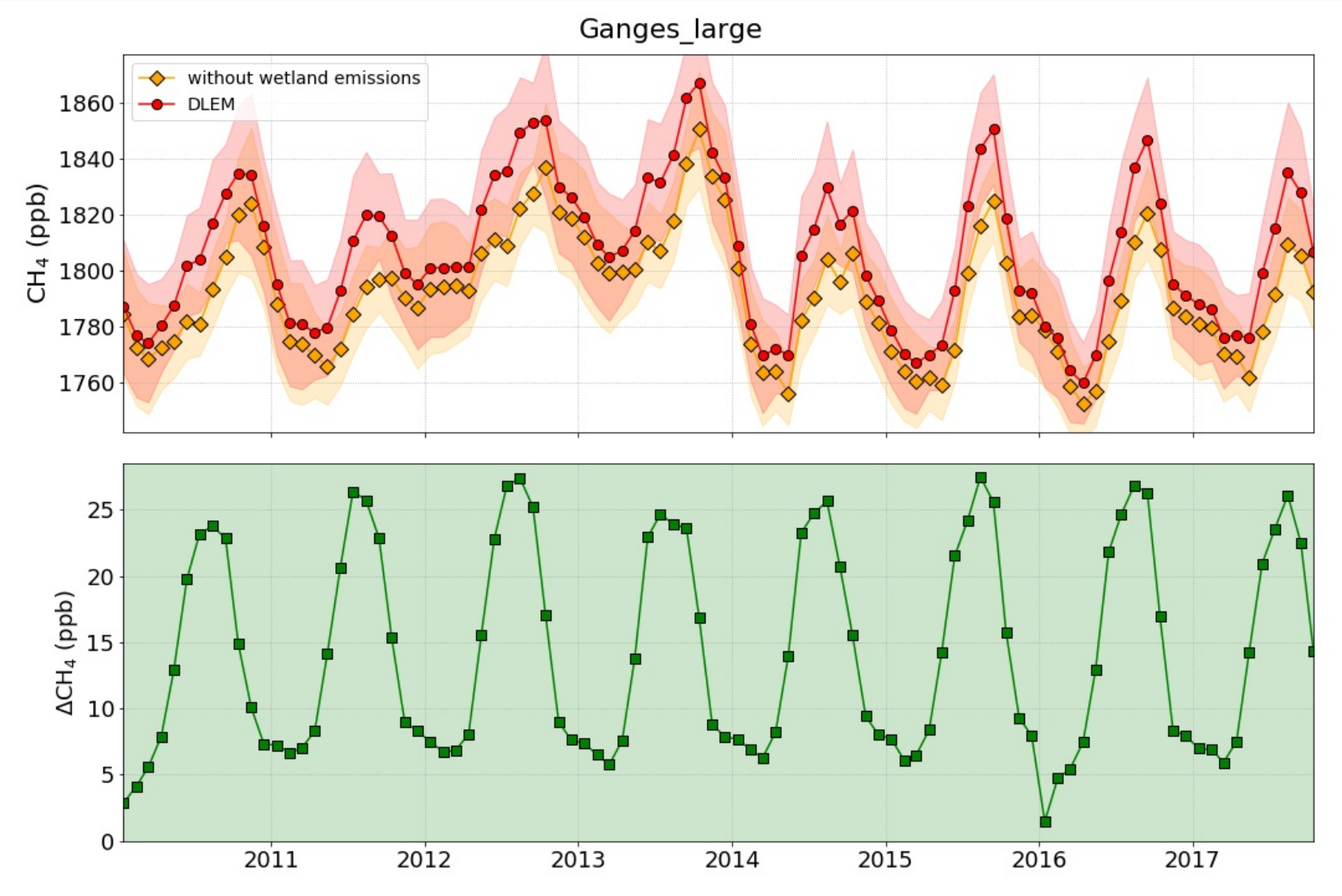

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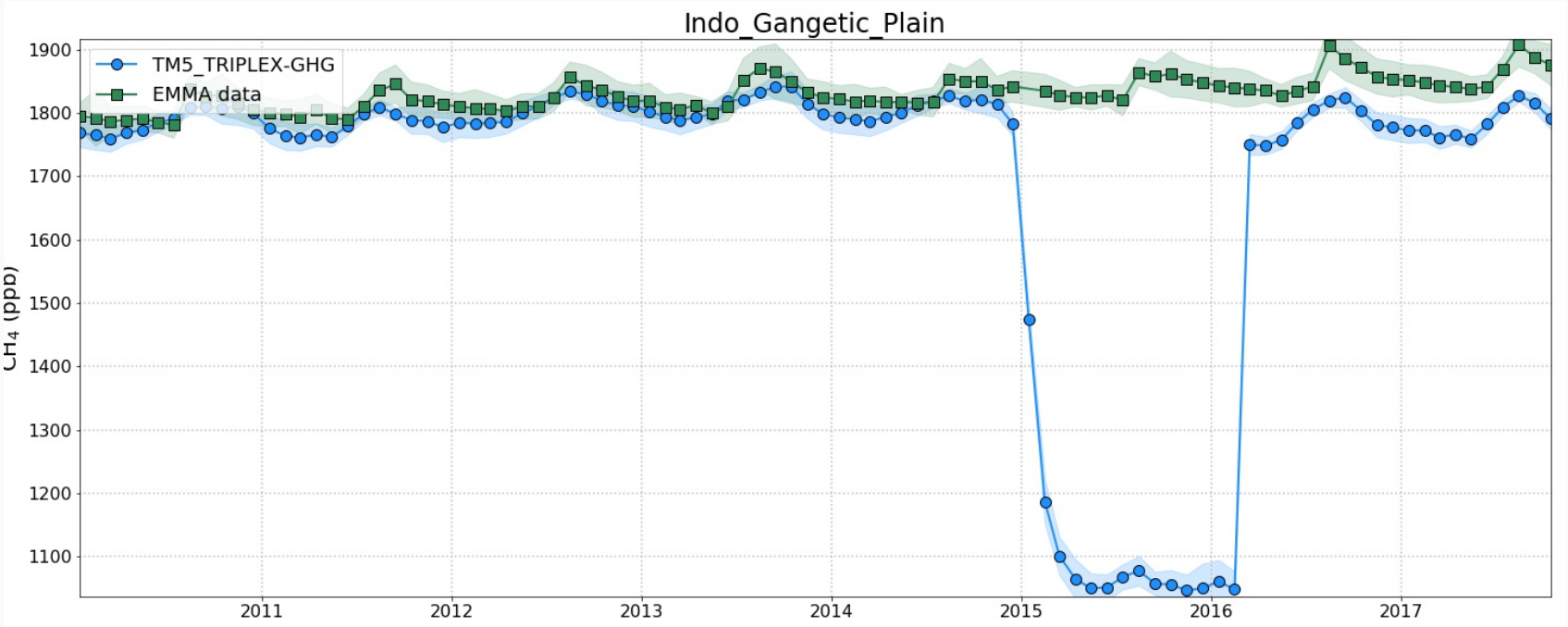

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- **evaluation of different wetland CH4 emission datasets using TM5 forward model & satellite data**

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- Remaining questions:
  - Which wetlands should we focus on? (Amazon?, Congo?, Ganges?)
  - How to solve the problem with CMIP6 data?