



ILMATIETEEN LAITOS  
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# Modeling BU natural CH<sub>4</sub> fluxes

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# Terrestrial CH<sub>4</sub> simulations

European and Global set-ups in resolutions of 0.1° and 1.875°, respectively.

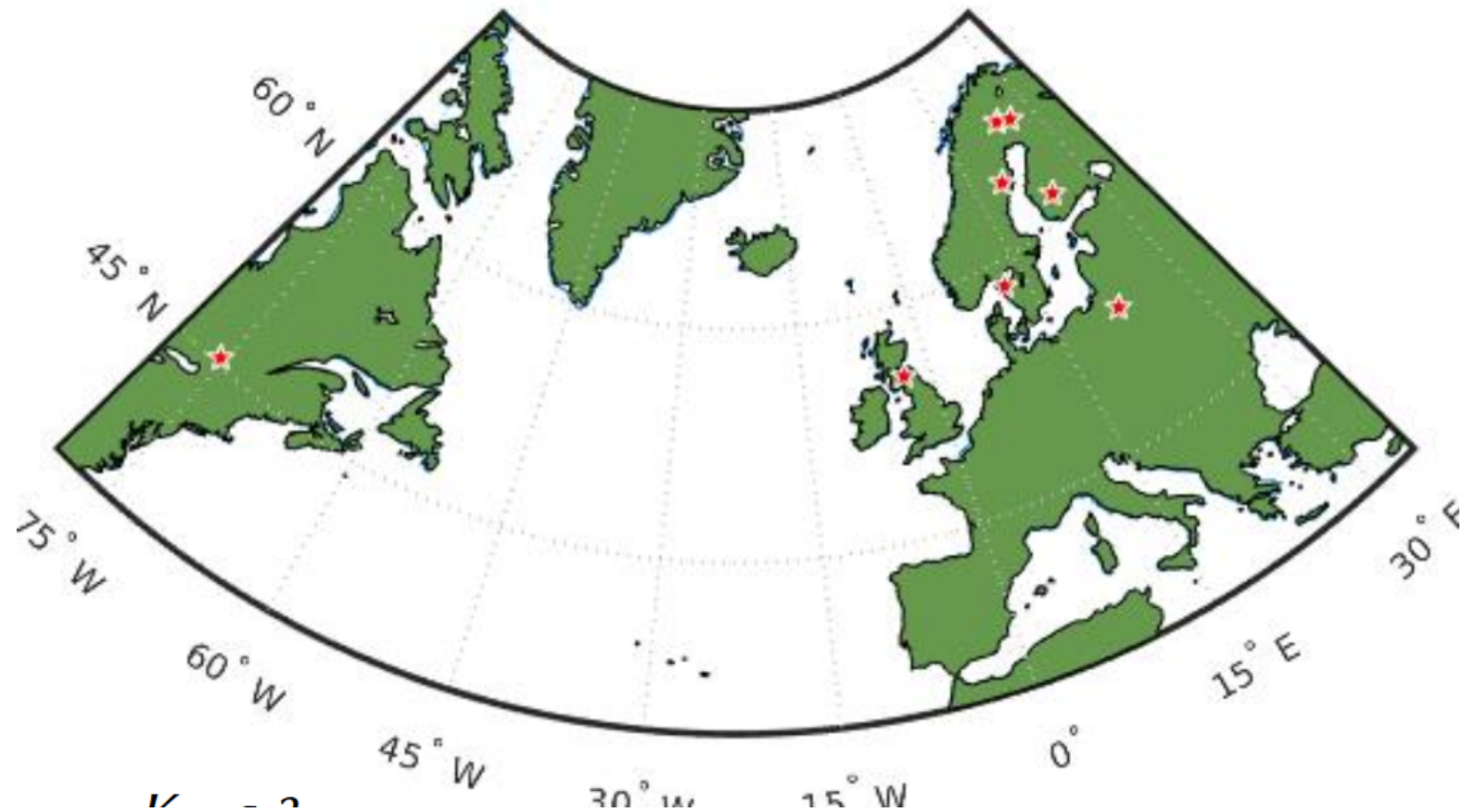
JSBACH-HIMMELI process model used for northern peatlands.

Mineral soils and inundated lands are calculated according to Spahni et al. (2011) with JSBACH input data.

European runs to be extended until the end of 2020 once CRUERA is available.

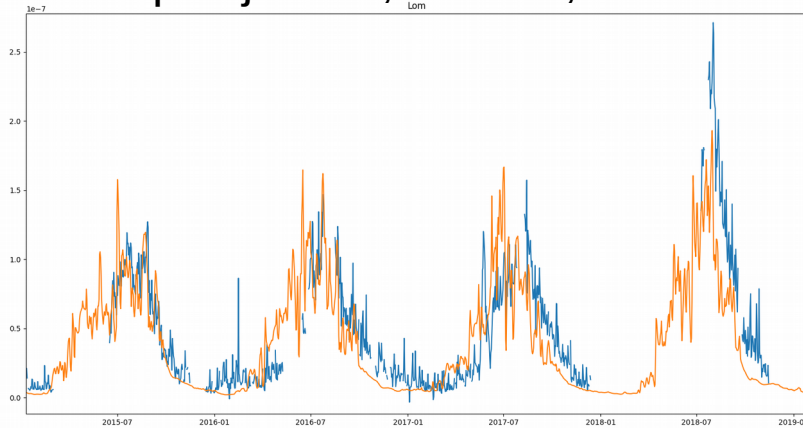
Global runs were recently run until the end of 2019 with CRUJRA2.1

# Peatland model evaluation against observations – site locations

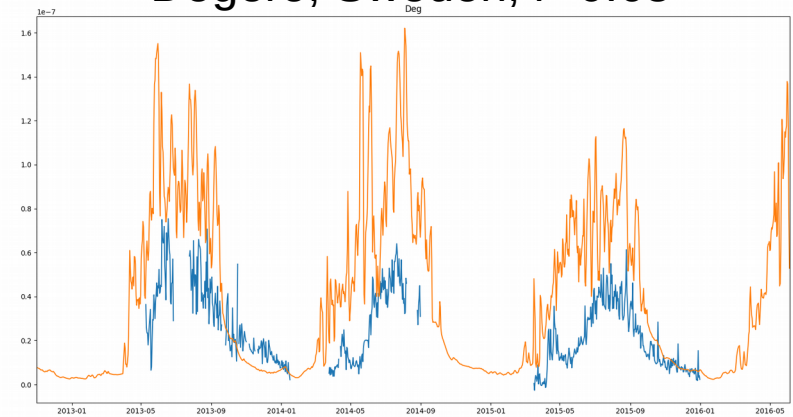


# Model evaluation against observations - peatlands

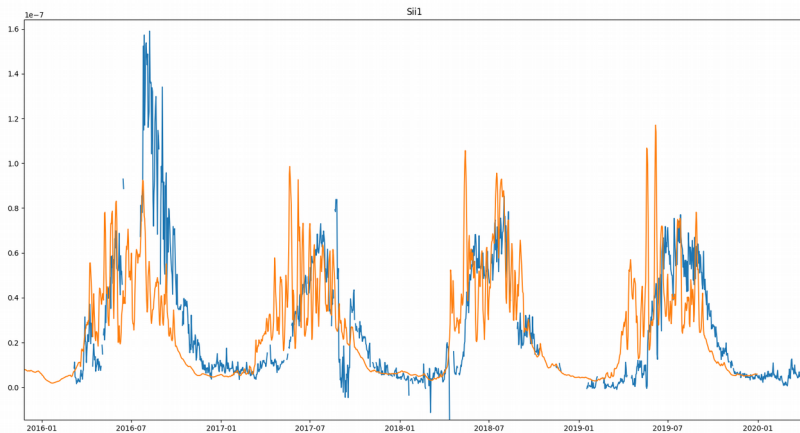
Lompolojänkkä, Finland,  $r=0.79$



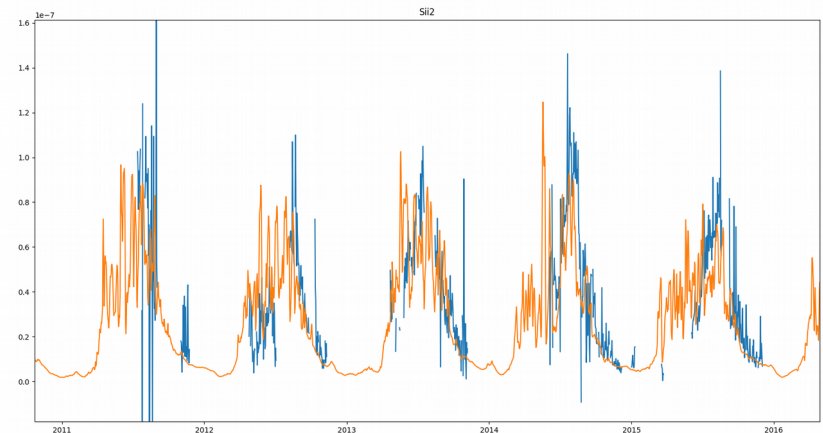
Degerö, Sweden,  $r=0.68$



Siikaneva fen, Finland,  $r=0.67$

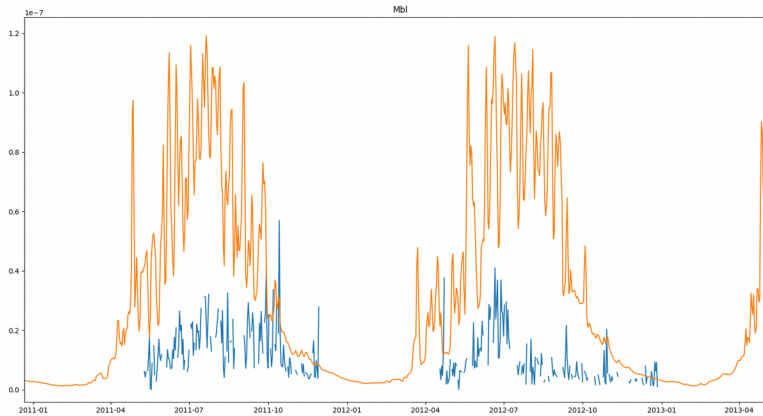


Siikaneva bog, Finland,  $r=0.60$

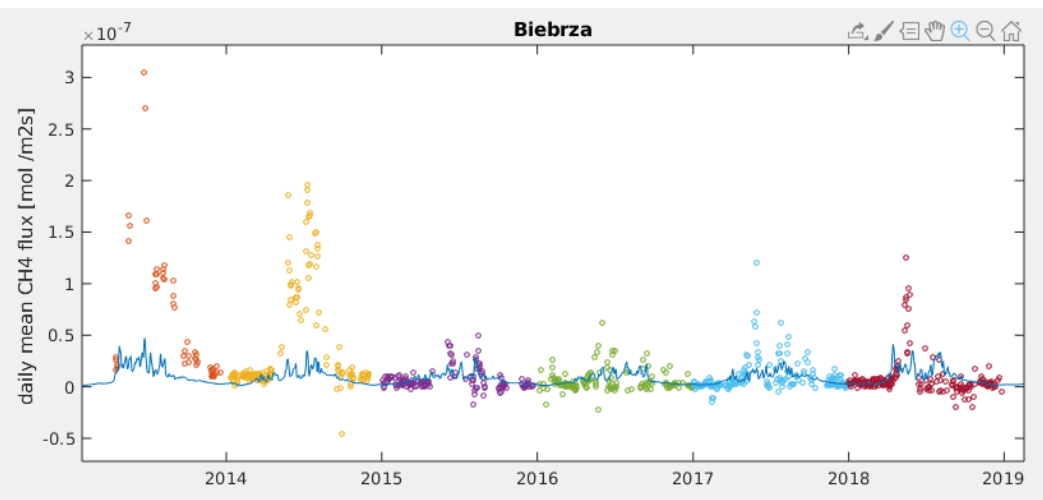


# Model evaluation against observations - peatlands

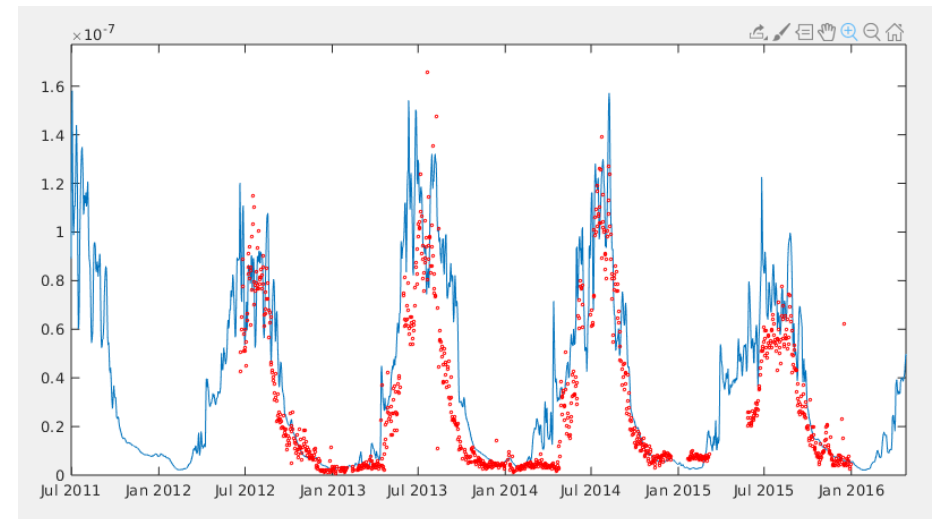
Mer Bleue, Canada,  $r=0.46$



Bierbza, Poland



Halssiaapa, Finland



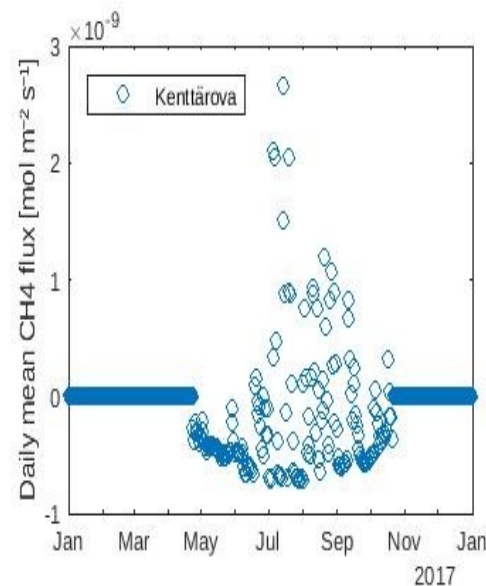
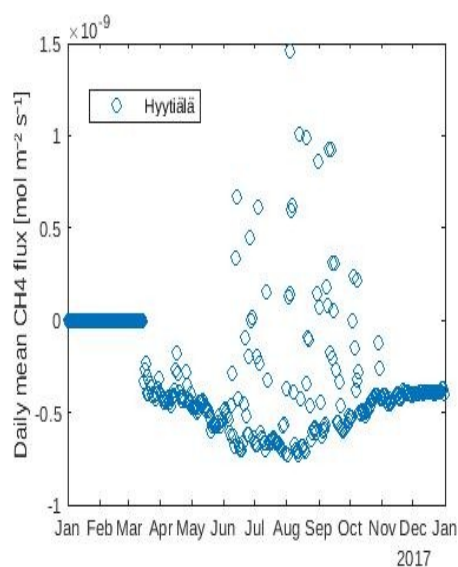
# Methane emission and uptake of mineral soils

## Modelling

- Mineral soils defined as land area that is not peatland
- CH<sub>4</sub> fluxes calculated applying parameterisations by Spahni et al. (2011)
  - Emission can occur if soil moisture threshold is exceeded; uptake slows down in wet soil
  - Input from JSBACH: soil parameters and soil moisture, temperature & respiration

## Site-level validation of model estimates with measurement data

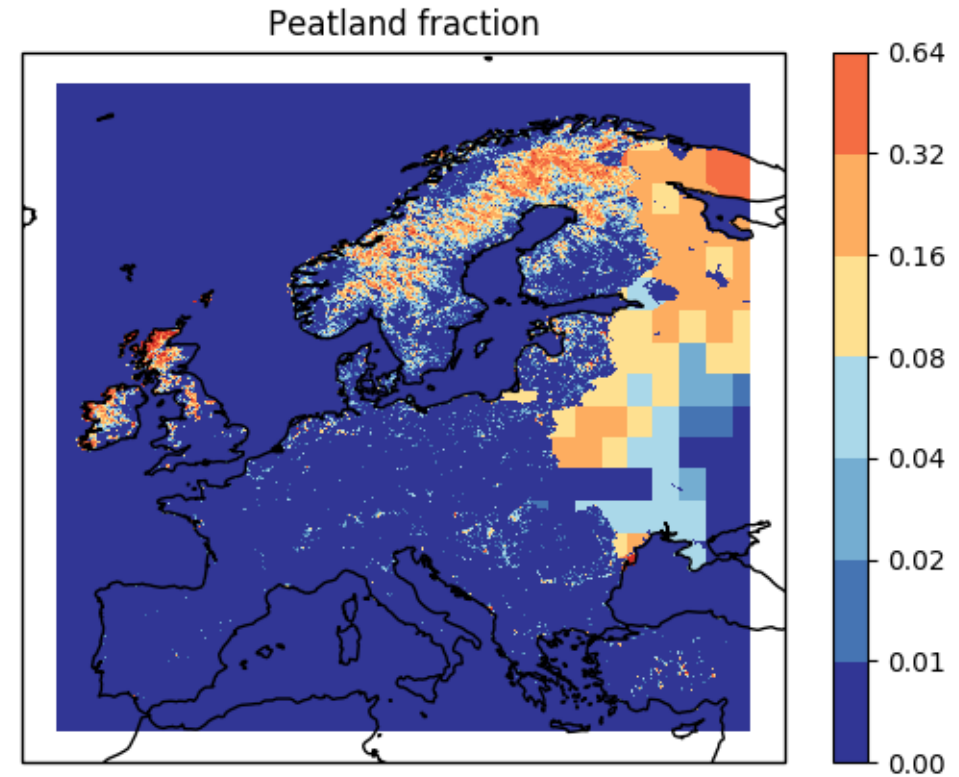
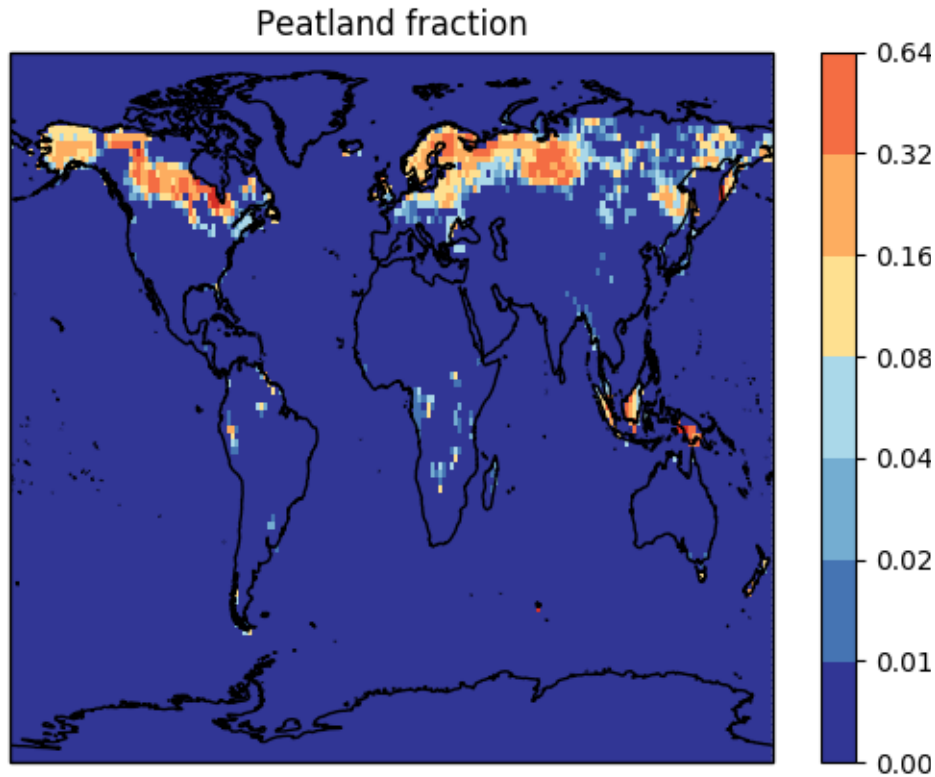
- Two examples: forests in Hyytiälä and Kenttäröva in Finland



- Vainio et al. 2020: measurements in May-Oct 2013-2014 in Hyytiälä
  - mean flux -1.6 nmol m<sup>-2</sup> s<sup>-1</sup>
  - peak emission (wet soil) 60 nmol m<sup>-2</sup> s<sup>-1</sup>
- Lohila et al. 2016: measurements in snow-free periods 2010-2013 at Kenttäröva
  - max uptake ~1.7 nmol m<sup>-2</sup> s<sup>-1</sup>
  - peak emission (wet soil) 65 nmol m<sup>-2</sup> s<sup>-1</sup>

- More measurement data is needed for validation (work underway)
- Important to evaluate the moisture threshold of CH<sub>4</sub> emission

# Prescribed peatland fractions in global and European domains





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# Thank you

Acknowledgements to observation site PIs:  
Krzysztof Fortuniak, Włodzimierz Pawlak,  
Mats Nilsson, Elyn Humphreys, Julia Drewer  
Annalea Lohila, Mika Aurela, Pavel  
Alekseychik and Eevastiina Tuittila

