

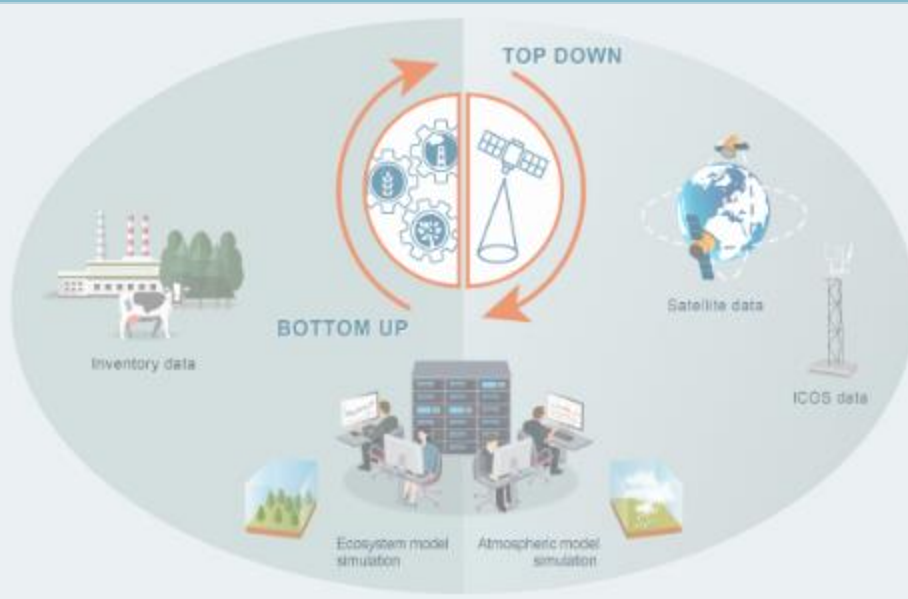


Messages from the synthesis: CH₄ & N₂O

Friday 13th, 2020
Teleconference

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VERIFY contributors

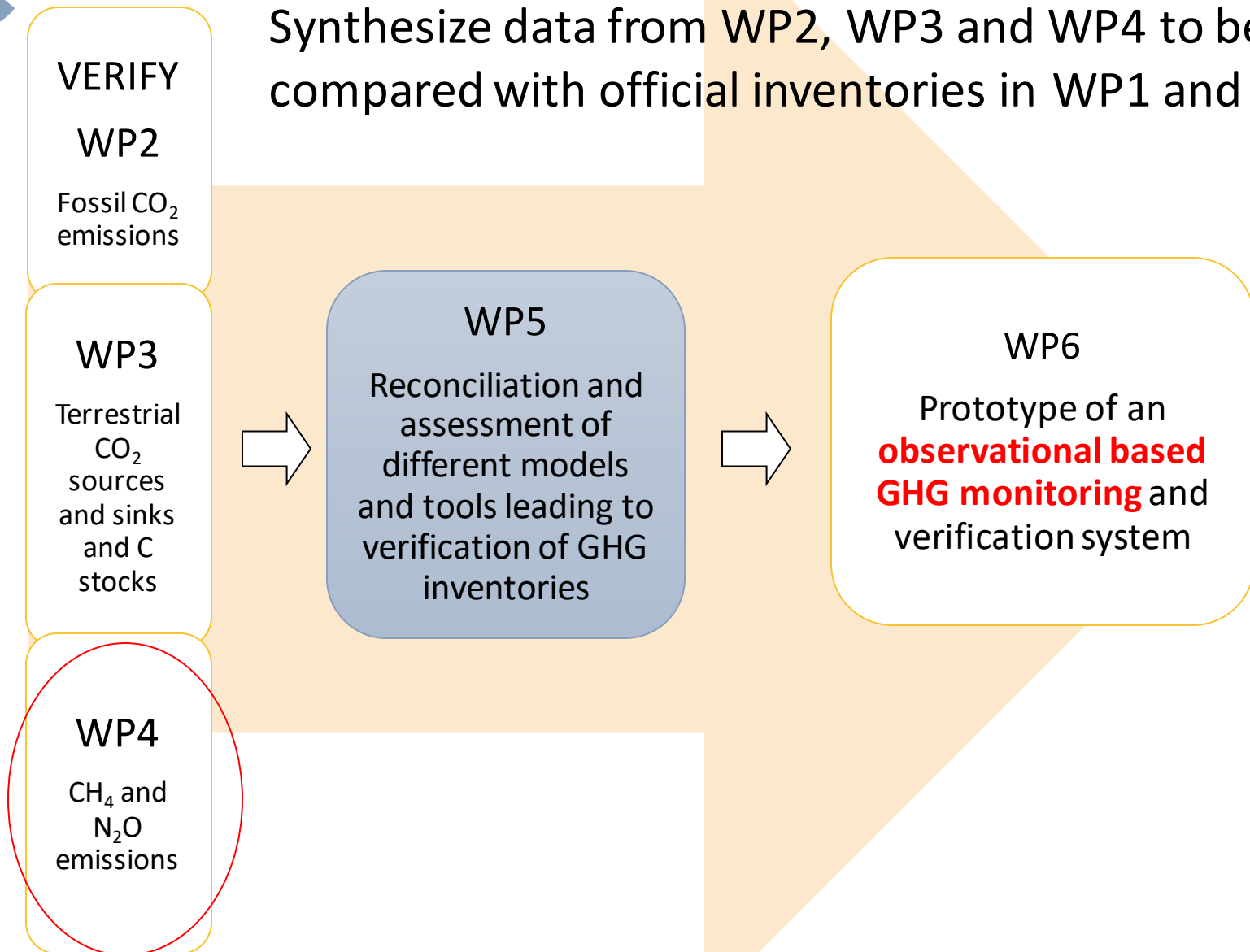
Vrije Universiteit Amsterdam, The Netherlands



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776810

VERIFY's synthesis objective:

Synthesize data from WP2, WP3 and WP4 to be compared with official inventories in WP1 and WP6





<http://webportals.ipsl.jussieu.fr/VERIFY/FactSheets/>
login: verify_guest passw: Verify_2020

The screenshot shows the VERIFY web portal interface. At the top, there is a browser address bar with the URL <http://webportals.ipsl.jussieu.fr/VERIFY/FactSheets/> and a "Not secure" warning. Below the browser bar, the page title is "VERIFY - FactSheets v1.24". A "How to use this site" tooltip is visible. The main content area is divided into several sections:

- Predefined set of Countries or Groups of countries:** A dropdown menu labeled "Select a preset".
- Countries:** A dropdown menu labeled "Select a country".
- Groups of countries (not mapped):** A dropdown menu labeled "Select a group of countries".
- Species Types and Plots:** A table with four rows, each representing a species type and its current selection status:

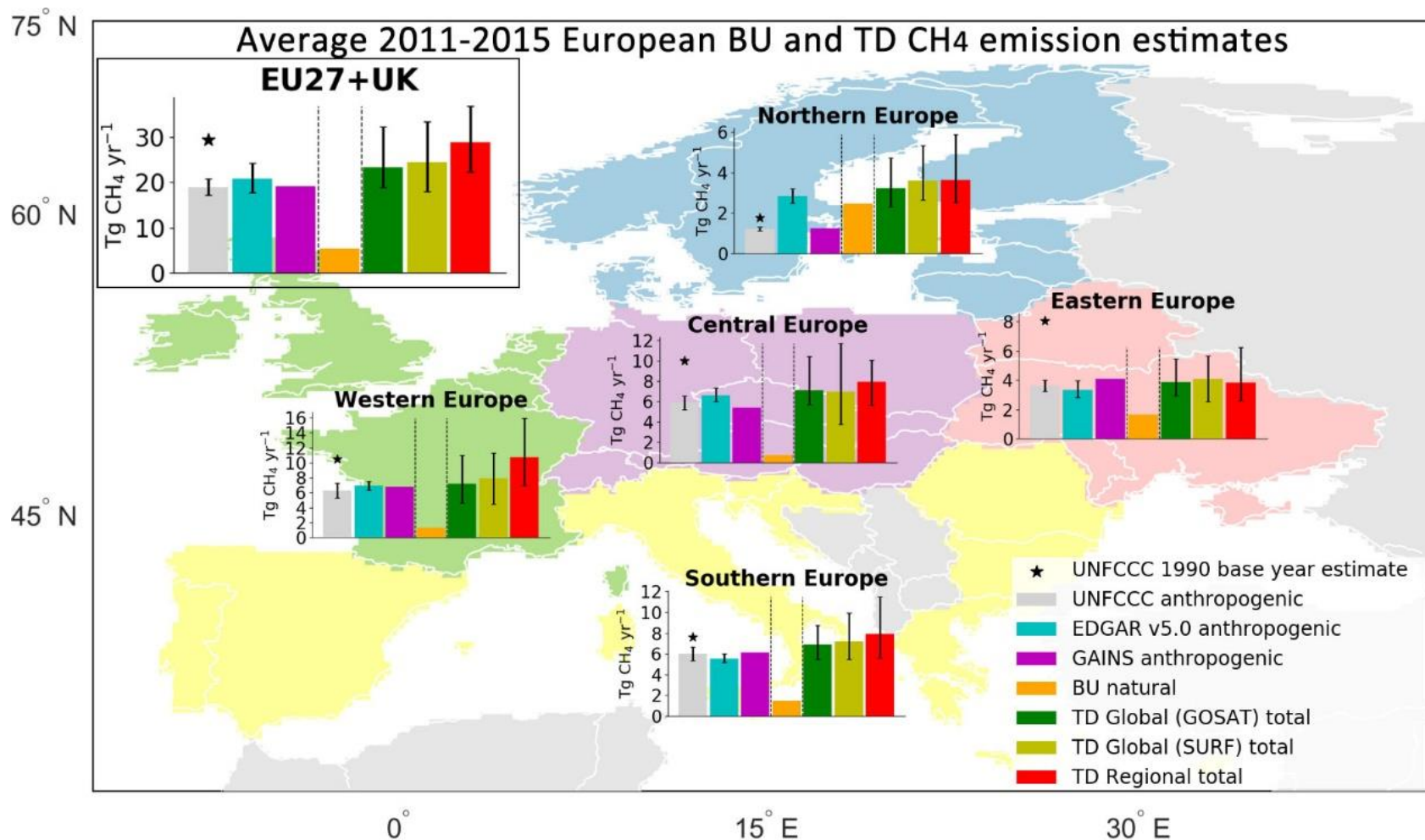
Species Type	Selection Status
Synthesis CO2land	None selected
Synthesis CO2fossil	None selected
Synthesis CH4	All selected (8)
Synthesis N2O	All selected (5)
- Map:** A map of Europe showing various countries colored in different shades. A tooltip for "EU-27+UK" is visible over the map.
- Buttons:** Four blue buttons are located on the right side of the interface:
 - Display plots
 - Display comments about plots
 - Display summary factsheets

We thank Patrick Brockmann, Matt McGrath and Philippe Peylin for the design and help with the web portal
We thank Matt McGrath, Chunjing Qiu and Robbie Andrew for the work on the plots



RESULTS FOR CH₄

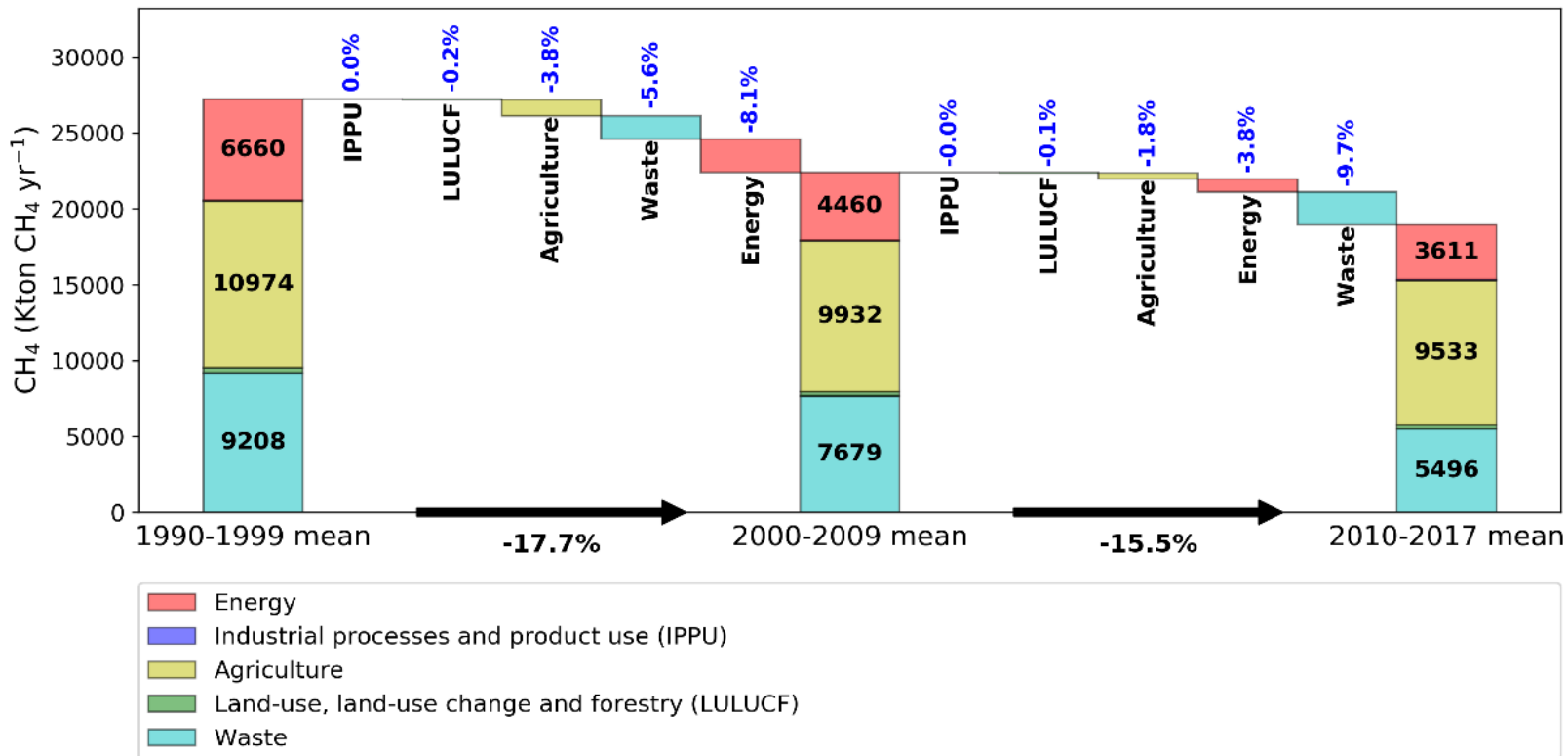
OVERVIEW OF CH₄ EMISSIONS



BU natural CH₄ emissions: sum of peatland (HIMMELI-JSBACH), geological (Hmiel et al., Etiope et al.,) and inland waters (lakes and reservoirs)_ULB

NGHGI DATA - CH₄ TRENDS

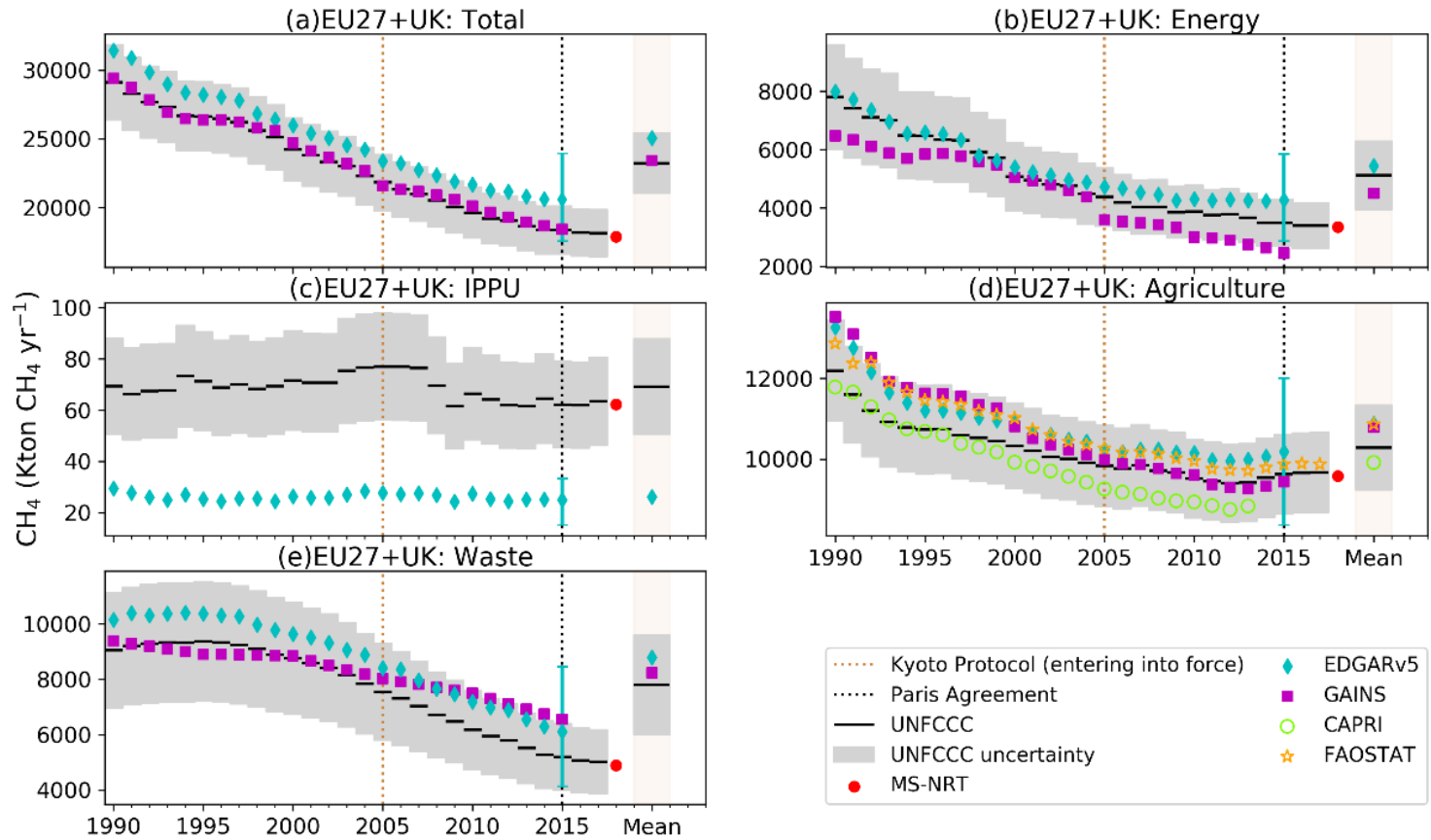
CH₄ emissions decadal changes from UNFCCC NGHGI (2019) for EU27 + UK



The sectors contributing the most to the reduced emissions are Energy and Waste (EU methane strategy published in 1996 and Directive 1999/31/ EC on the landfill of waste)

NGHGI AND OTHER BOTTOM-UP CH₄ EMISSIONS

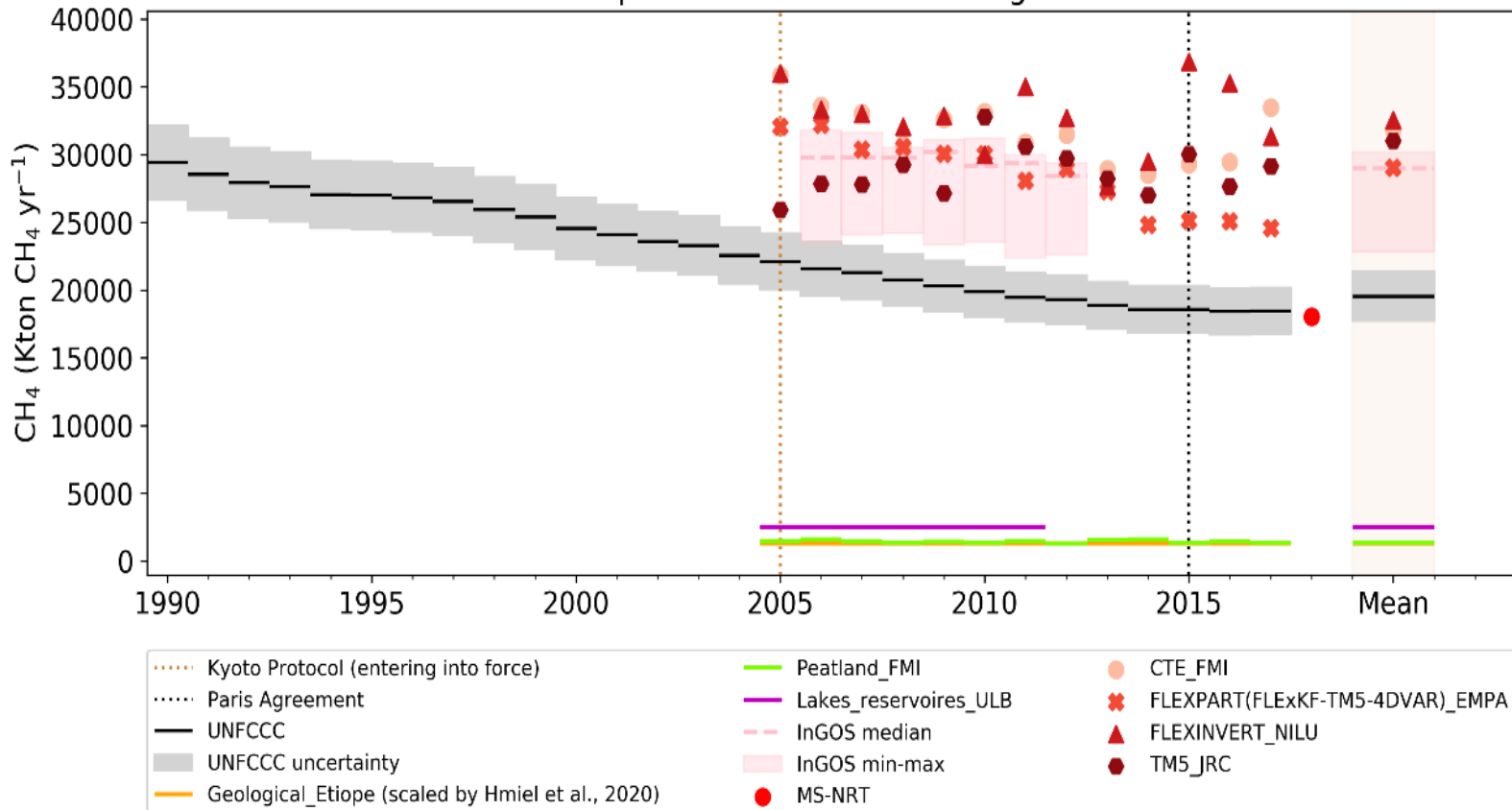
Total anthropogenic CH₄ emissions (excl. LULUCF): EU27+UK and sector totals



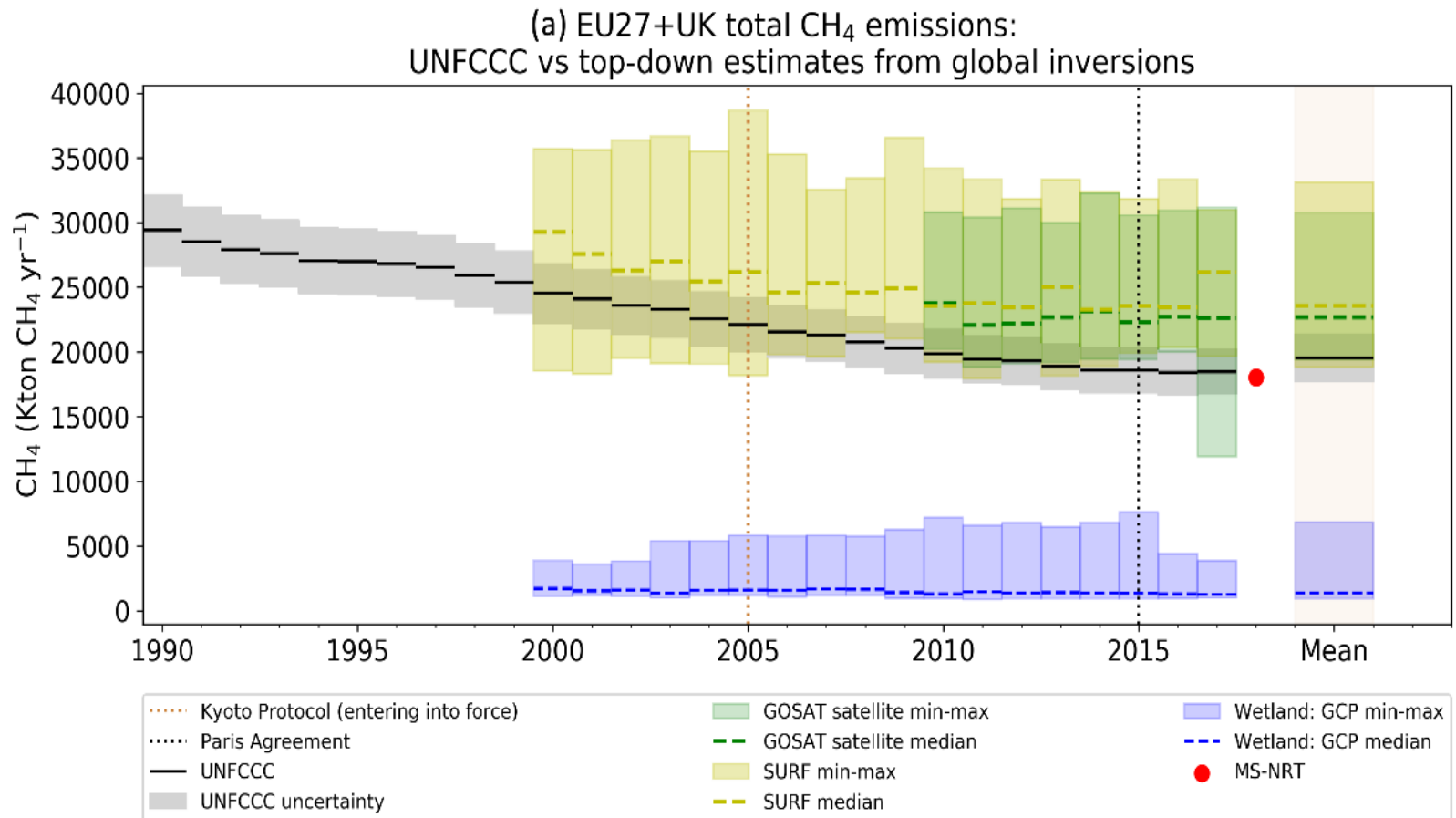


NGHGI ANTHROPOGENIC (INCL. LULUCF), REGIONAL TD TOTAL AND NATURAL BU CH₄ EMISSIONS

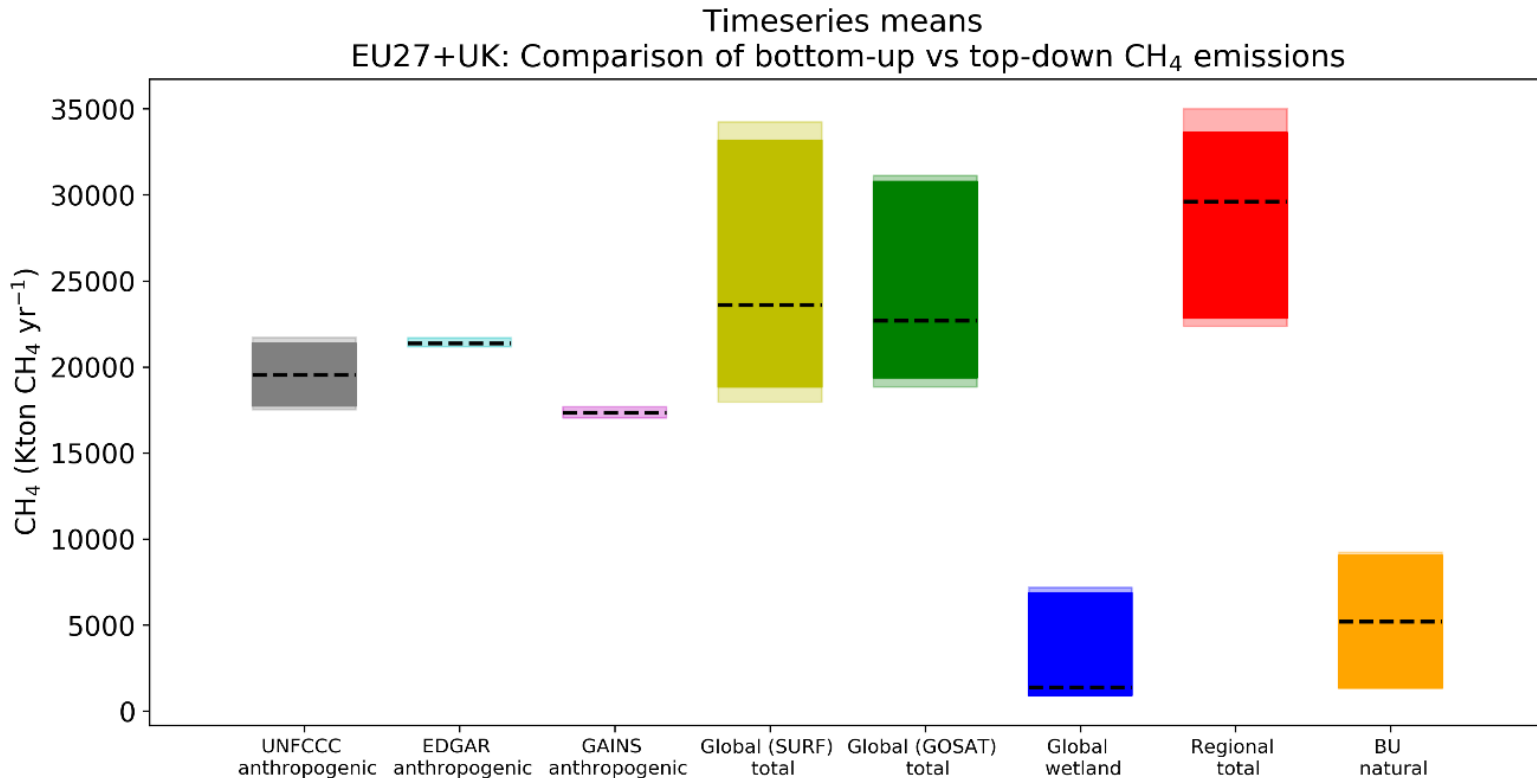
(a) EU27+UK total CH₄ emissions:
UNFCCC vs top-down estimates from regional inversions



NGHGI ANTHROPOGENIC (INCL. LULUCF), GLOBAL TD TOTAL AND NATURAL TD CH₄ EMISSIONS



OVERLAPPING 2010-2012 MEANS – CH₄



Future need of better quantification of natural BU CH₄ fluxes which at both global and regional level might be the key for explaining the differences between anthropogenic BU and total TD estimates



MAIN FINDINGS – CH₄

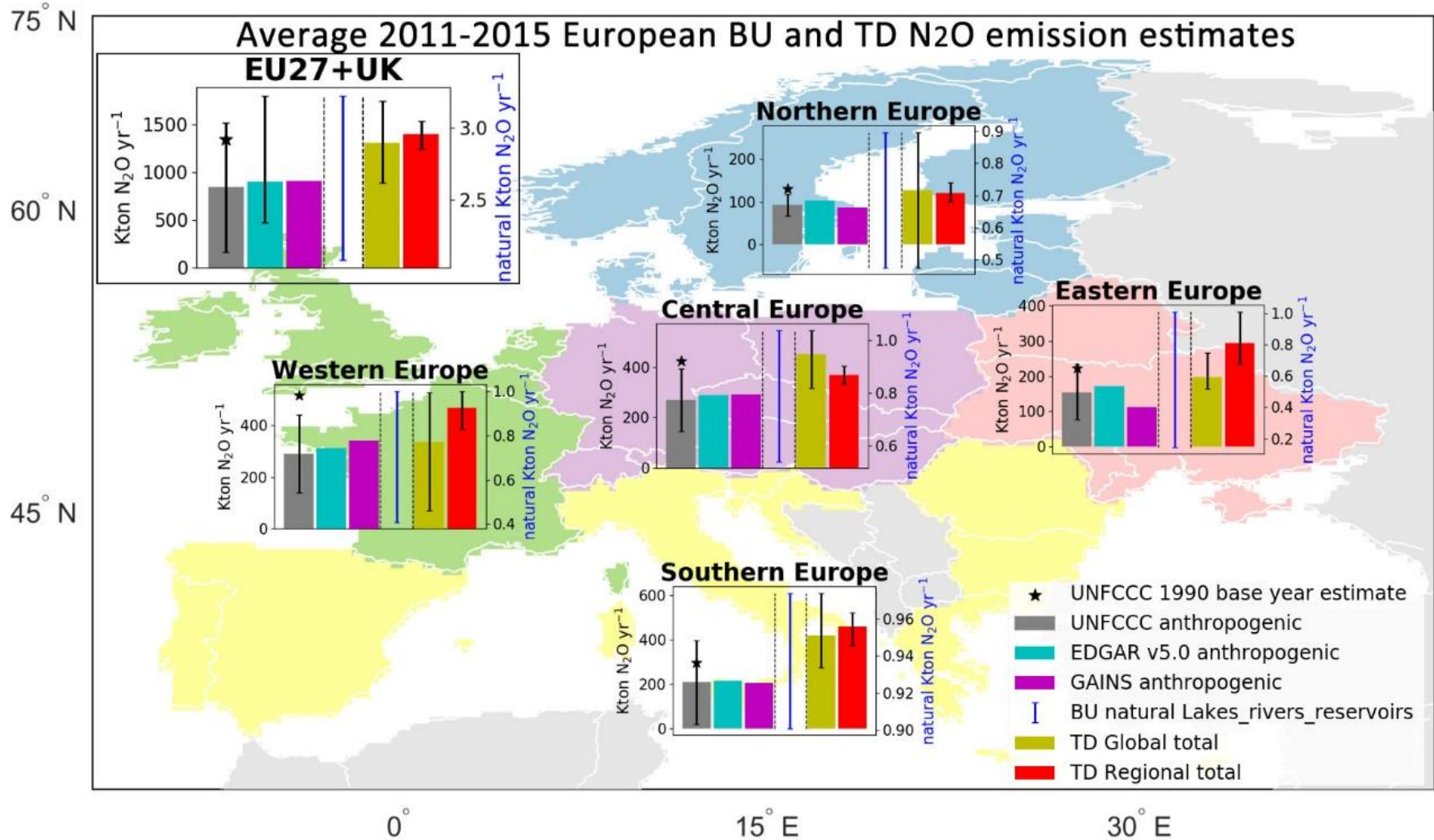
- ❏ Bottom-up estimates are, in general within the uncertainty range of the NGHGI data.
- ❏ The main differences are caused by the application of different tiers and methods used in calculating emissions, especially for agriculture (e.g. the use of AD and EFs as discussed in Petrescu et al., 2020 AFOLU publication) and the allocation of emissions to different sectors (mostly between 1B fugitives and 2 IPPU).
- ❏ As NGHGI do not report natural emissions, to use TD as verification tools*, we advocate the need of better quantification of these estimates. We found that, at both global and regional level, this might be the missing link when explaining the differences between anthropogenic BU and total TD estimates.

*UNFCCC 2019 Refinement advises the MS to actively try to include total TD estimates in their country reporting



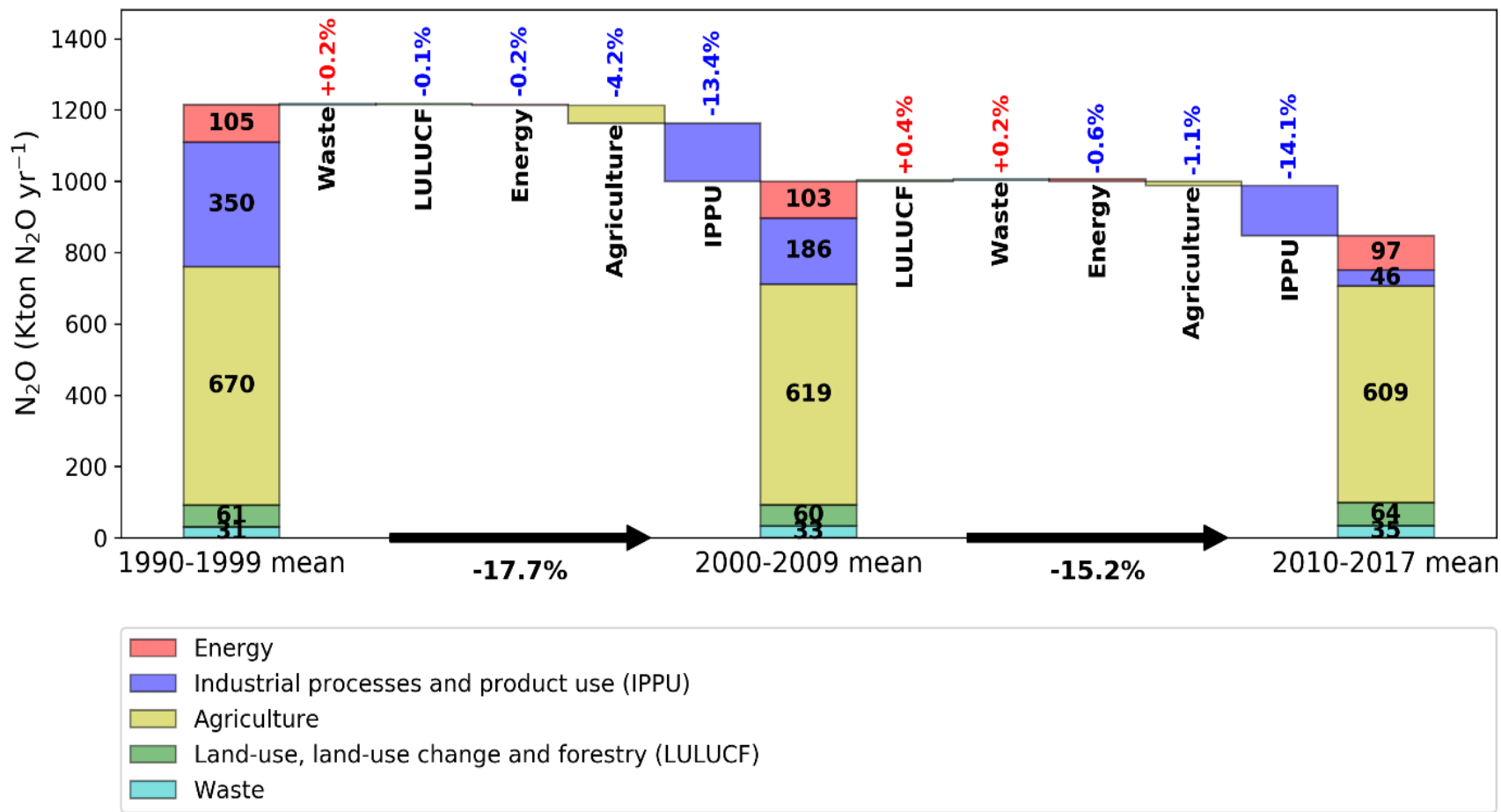
RESULTS FOR N₂O

OVERVIEW OF N₂O EMISSIONS



NGHGI DATA - N₂O TRENDS

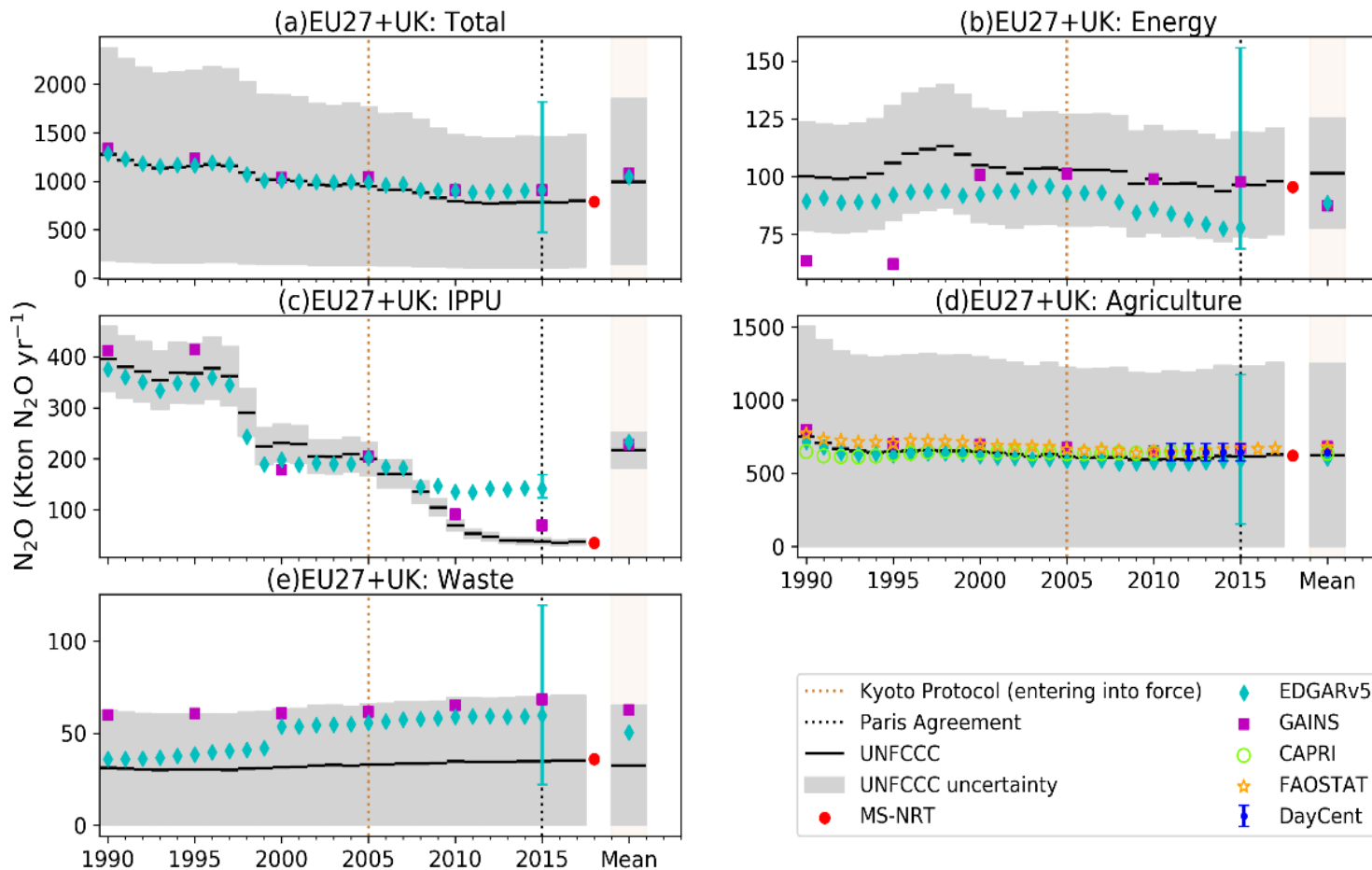
N₂O emissions decadal changes from UNFCCC NGHGI (2019) for EU27 + UK



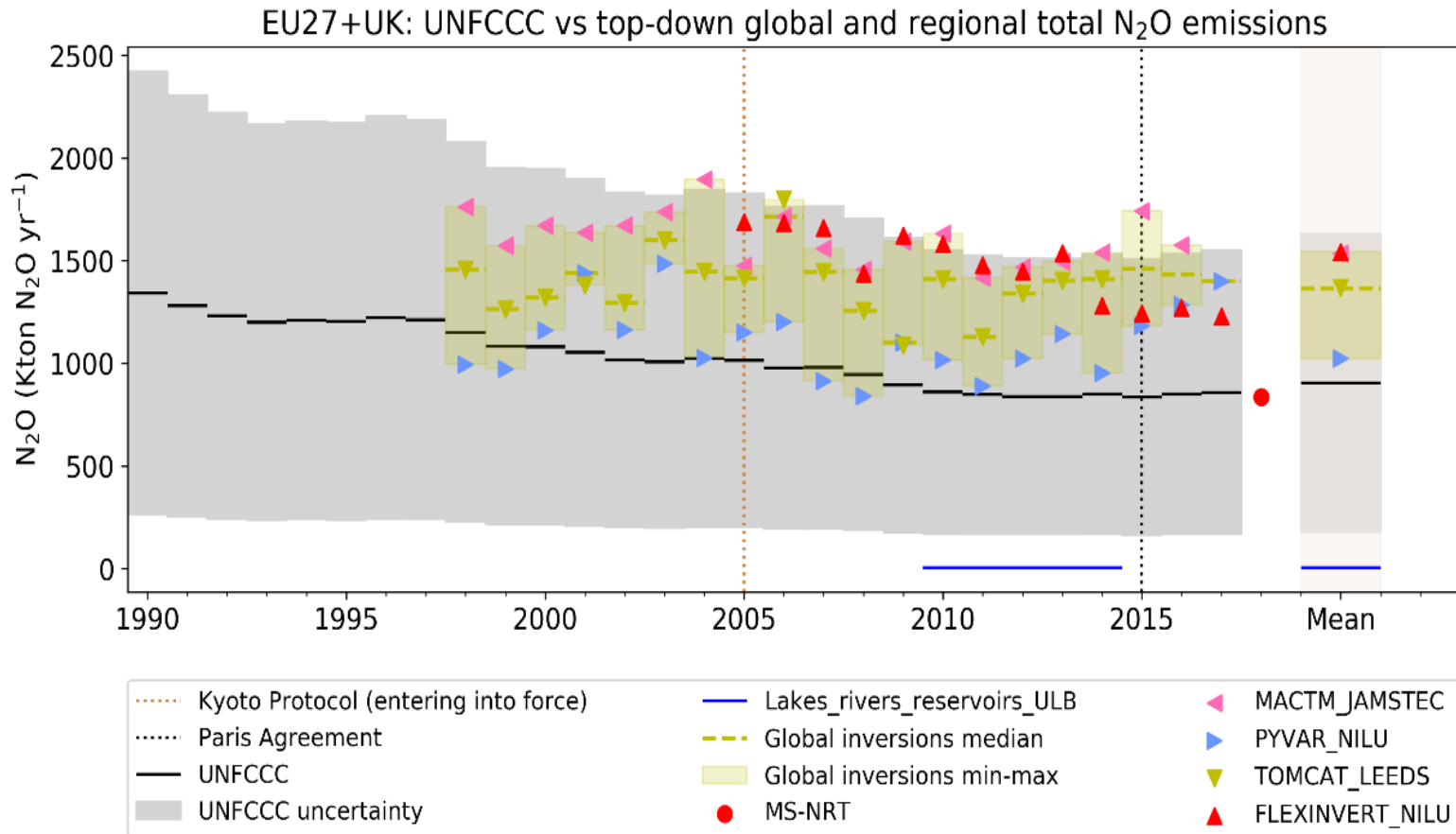
The sector contributing the most to the reduced emissions is IPPU (in1990's and early 2000's the five European adipic acid plants were equipped with efficient abatement technology, cutting emissions by 95-99%) Still Agriculture contributes the most (69% in 2017)

NGHGI AND OTHER BOTTOM-UP N₂O EMISSIONS

Total anthropogenic N₂O emissions (excl. LULUCF): EU27+UK and sector totals



NGHGI ANTHROPOGENIC (INCL. LULUCF), REGIONAL AND GLOBAL TD TOTAL AND NATURAL BU N₂O EMISSIONS



MAIN FINDINGS – N₂O

- NGHGI N₂O uncertainties are very large (80 % for EU27+UK)
- For all IPCC sectors, the BU anthropogenic estimates show consistent trends and values with the NGHGI (best fit for agriculture, IPPU)
- Overall, in EU27+UK the highest uncertainty in the UNFCCC NGHGI reporting (2018) comes from the waste sector (626 %), followed by agriculture (107%).
- For TD it is impossible to separate the N₂O natural from anthropogenic sources (uncertainty introduced by definitions*). Natural soils (unmanaged) can have both natural and anthropogenic emissions while anthropogenic (managed) agricultural soils can also have a level of natural emissions.
- Further improvement of inverse methods for N₂O is needed to determine the total level of emissions and, most importantly, the trends.

*natural N₂O is defined as level of emissions in the pre-industrial period)



Thank you for your attention

For questions/comments please send an email to:
a.m.r.petrescu@vu.nl



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