VERIFY General Assembly

WP4 -Bottom Up Approaches for N_2O fluxes

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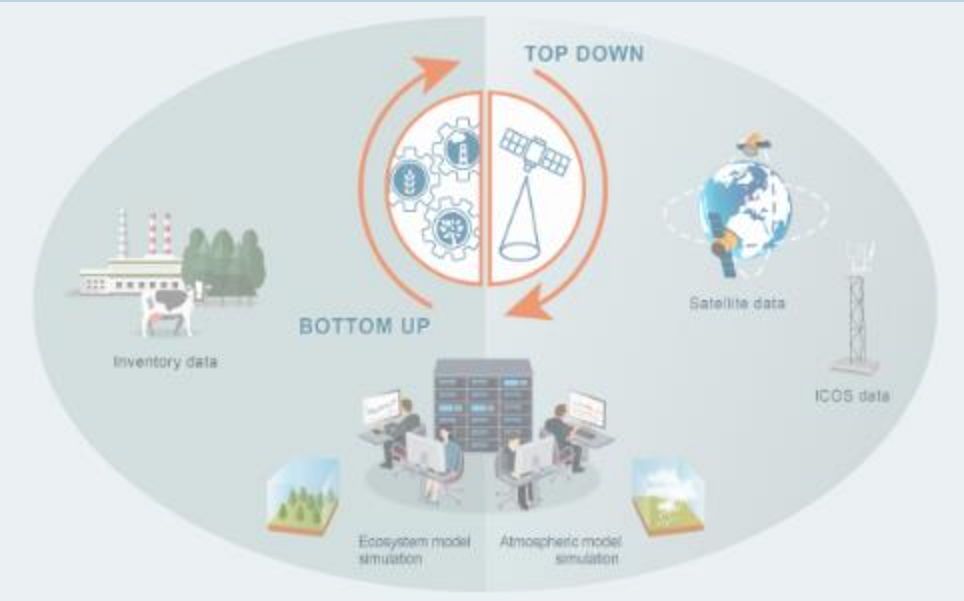
May 9th -11th , 2022



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WP4-Bottom up budget of N_2O fluxes

APPROACHES

All sectors:

- **EDGAR:** IPCC methodology (TIER 1; TIER 2); National scale and 0.1 x 0.1 degree resolution grid data

Agricultural sector:

- **CAPRI:** IPCC methodology (TIER 1; TIER 2);

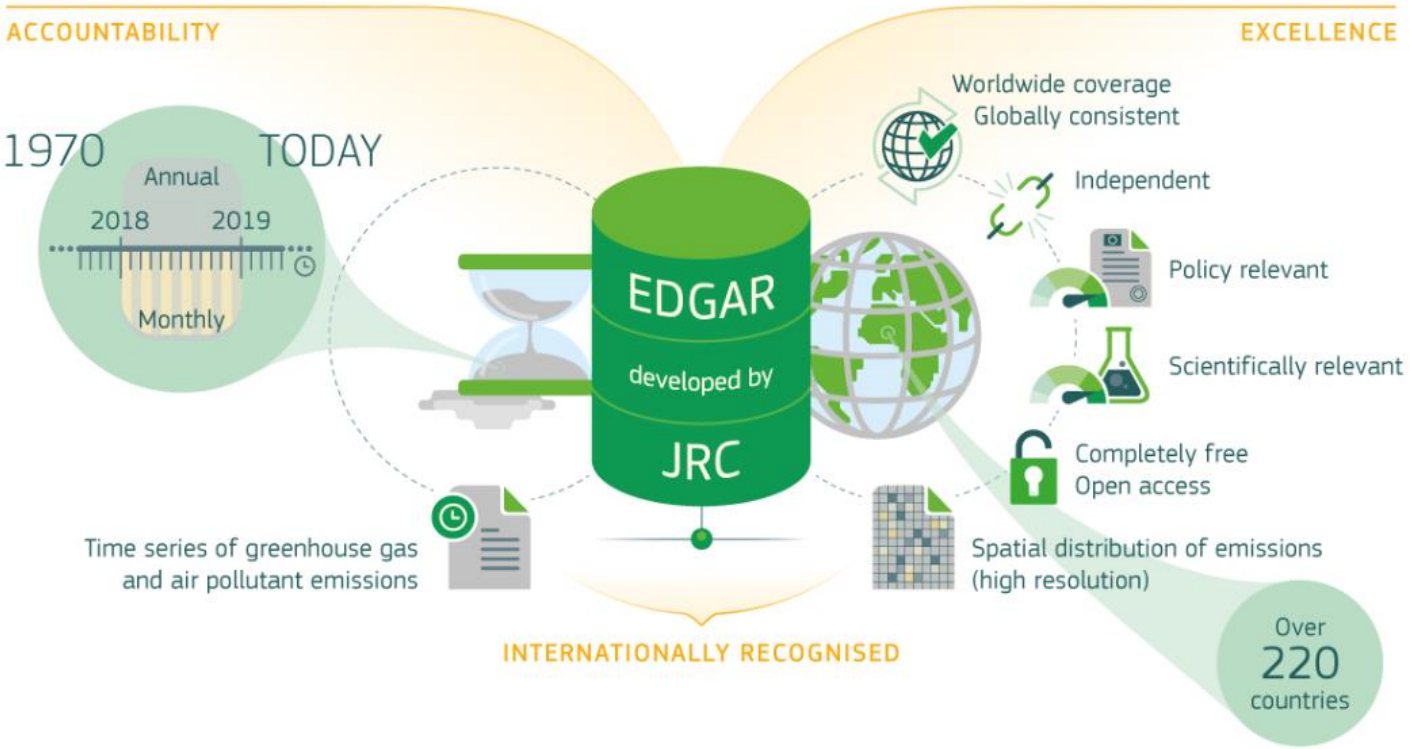
- **ECOSSE:** Process-based model (TIER 3); Grid map 0.25 x 0.25 degree; daily time steps; crop specific modelling

WP4-EDGAR: Structure

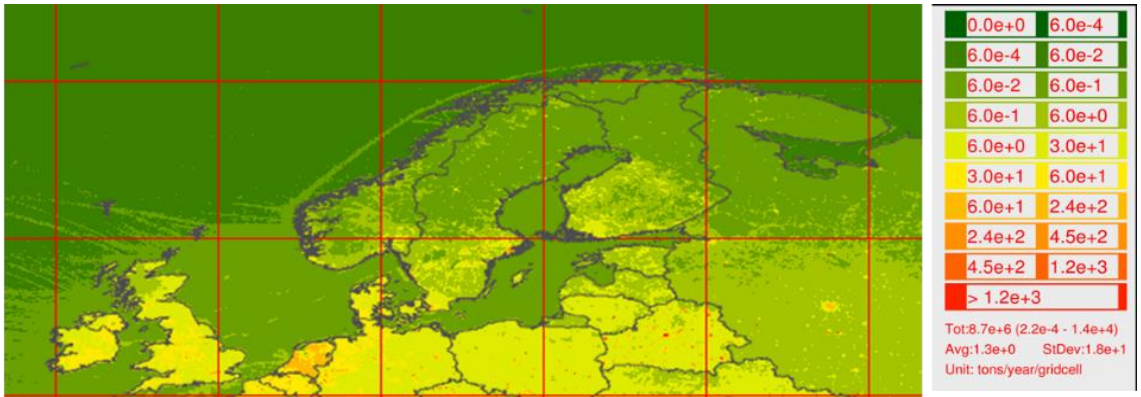
MAPPING HUMAN EMISSIONS ON EARTH

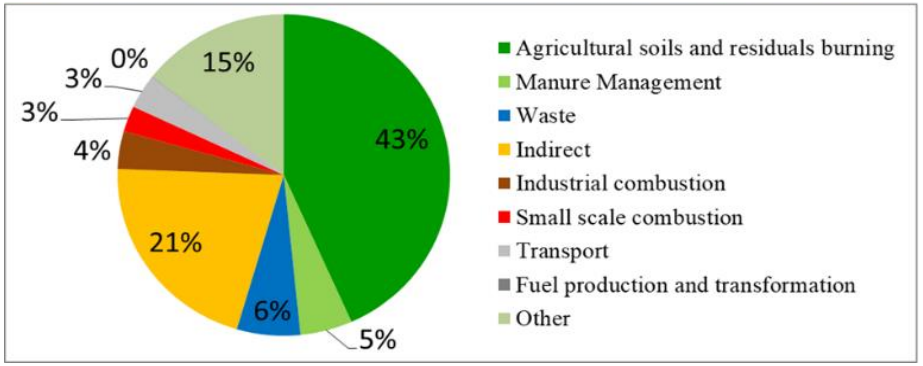
EDGAR - Emissions Database for Global Atmospheric Research

EDGAR is a multipurpose, independent, global database of anthropogenic emissions of greenhouse gases and air pollution on Earth. EDGAR provides independent emission estimates compared to what reported by European Member States or by Parties under the United Nations Framework Convention on Climate Change (UNFCCC), using international statistics and a consistent IPCC methodology.
EDGAR provides both emissions as national totals and gridmaps at 0.1 x 0.1 degree resolution at global level, with yearly, monthly and up to hourly data.



WP4-EDGAR





N_2O emissions for 2018.

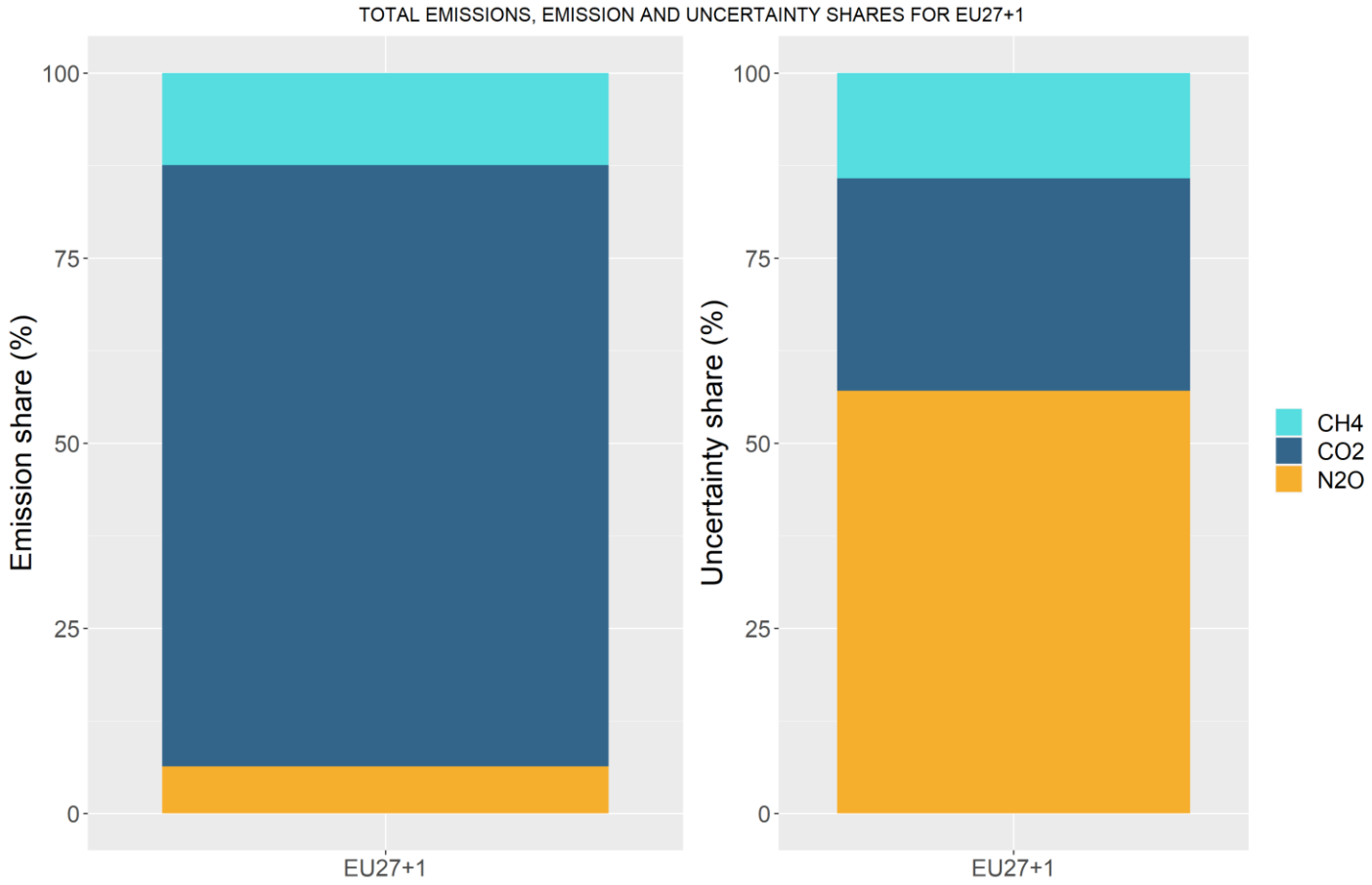
WP4-EDGAR: Assumptions for uncertainty

- Uncertainties of different sources are uncorrelated
- Subsectors are correlated (unc. of sum = sum of unc.)
- Aggregation of emissions from same category, but different country: ⇨ full correlation

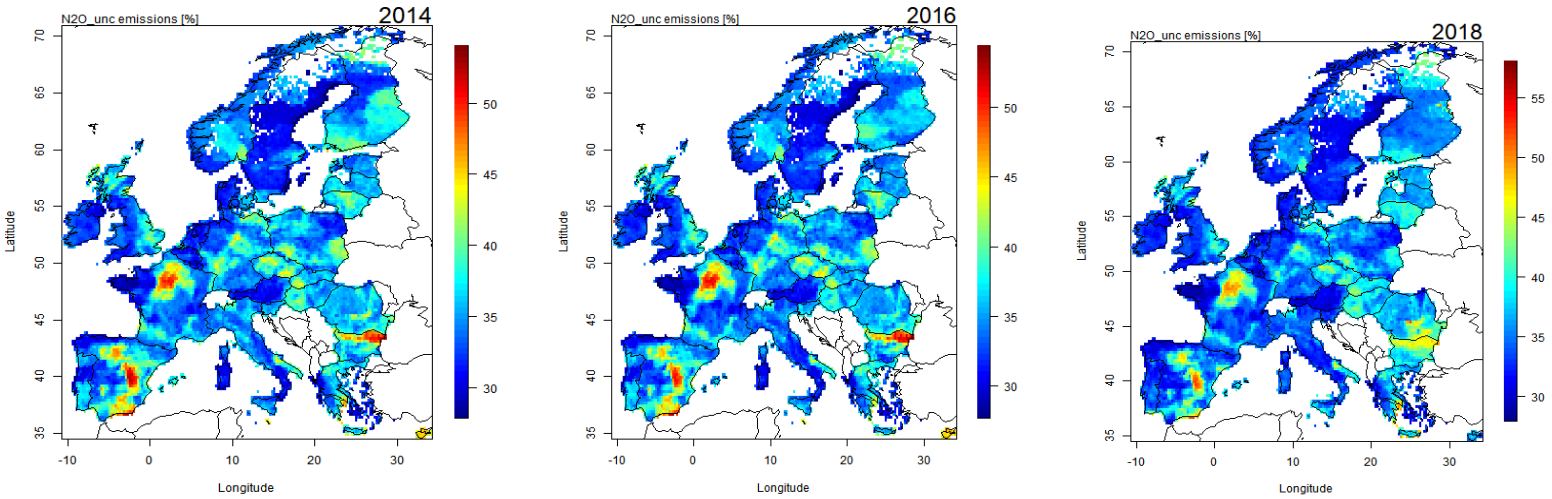
  EXCEPTION : country specific emission factor
- If uncertainty is defined within a range, the upper bound is assigned to the developing country and the lower bound to the developed country

More details in Solazzo et al., 2021

WP4-EDGAR: Uncertainty analysis



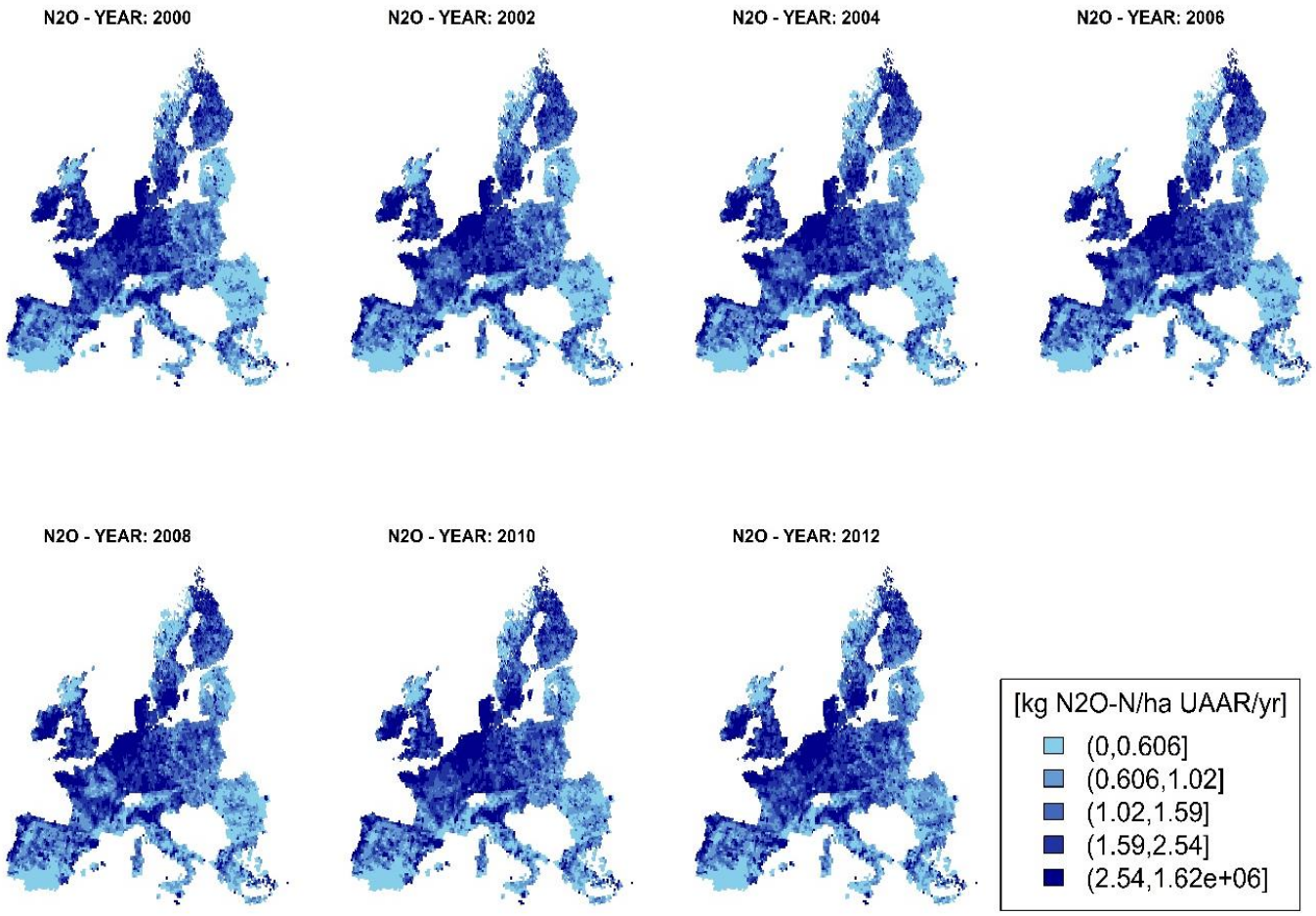
WP4-CAPRI: Uncertainty analysis



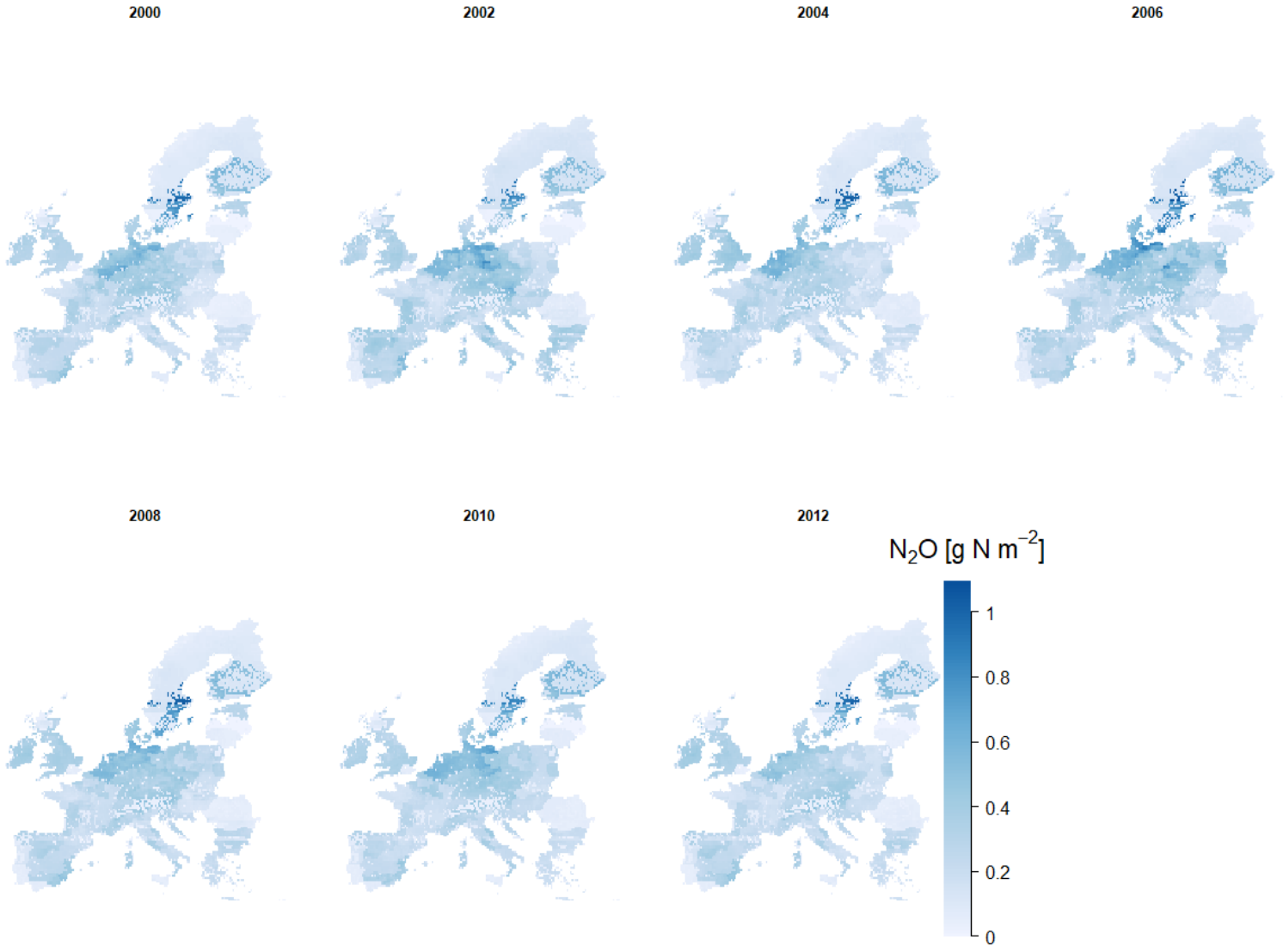
Assumptions for uncertainty:

- the disaggregation having an uncertianty of 50% for N2O and 20% for CH4.
- the emission processes have uncertianty of:
  - 50%: N2O soil processes;
  - 30%: N2O manure processes;
  - 30%: CH4 manure and enteric, and
  - 10%: rice.

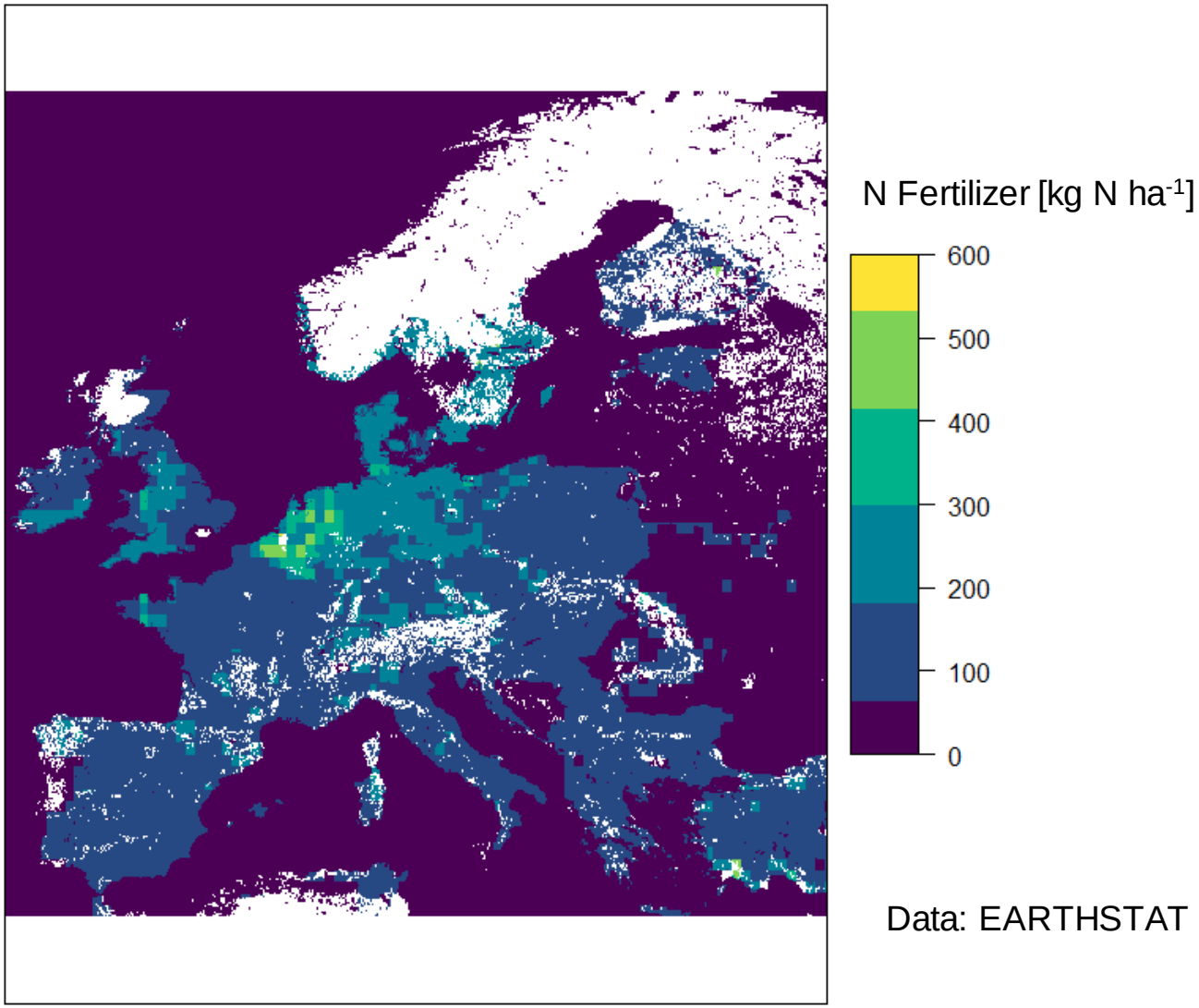
WP4-Bottom up N_2O fluxes CAPRI



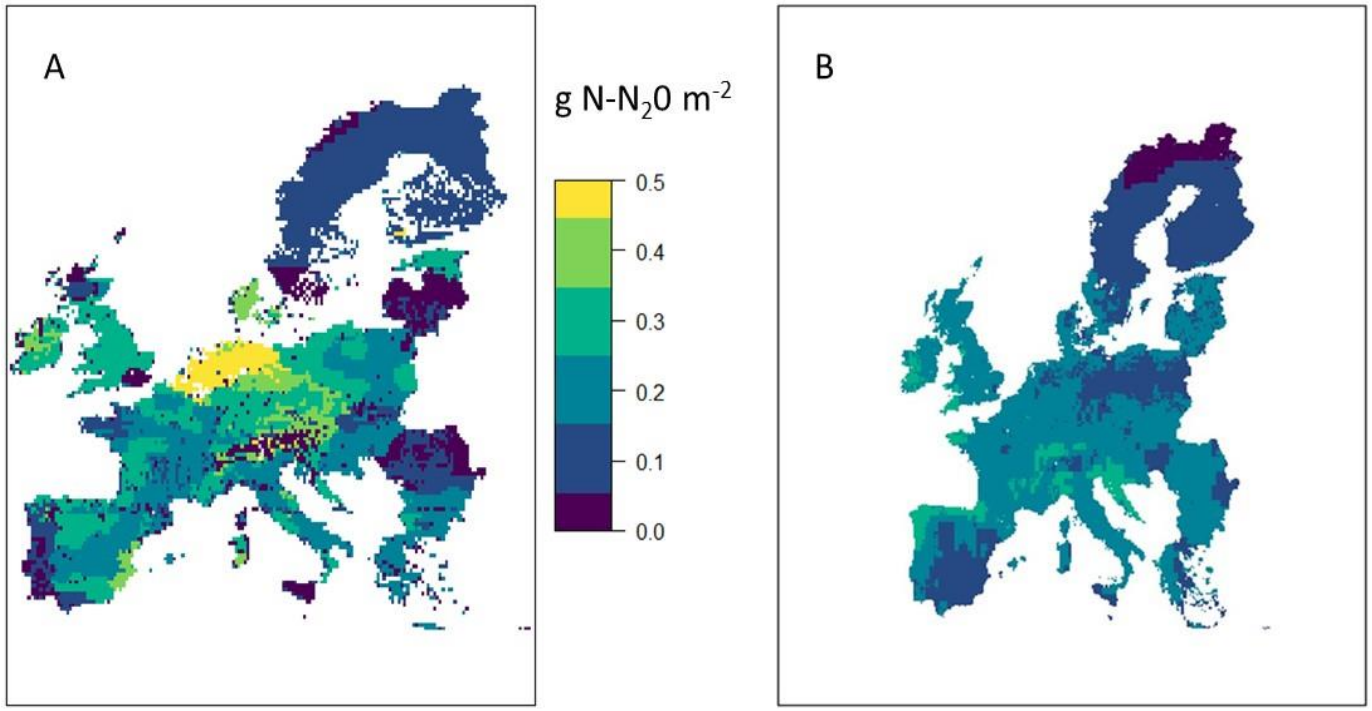
WP4-Bottom up N_2O fluxes ECOSSE



WP4-Fertilizer application Europe



WP4-Bottom up N_2O fluxes ECOSSE



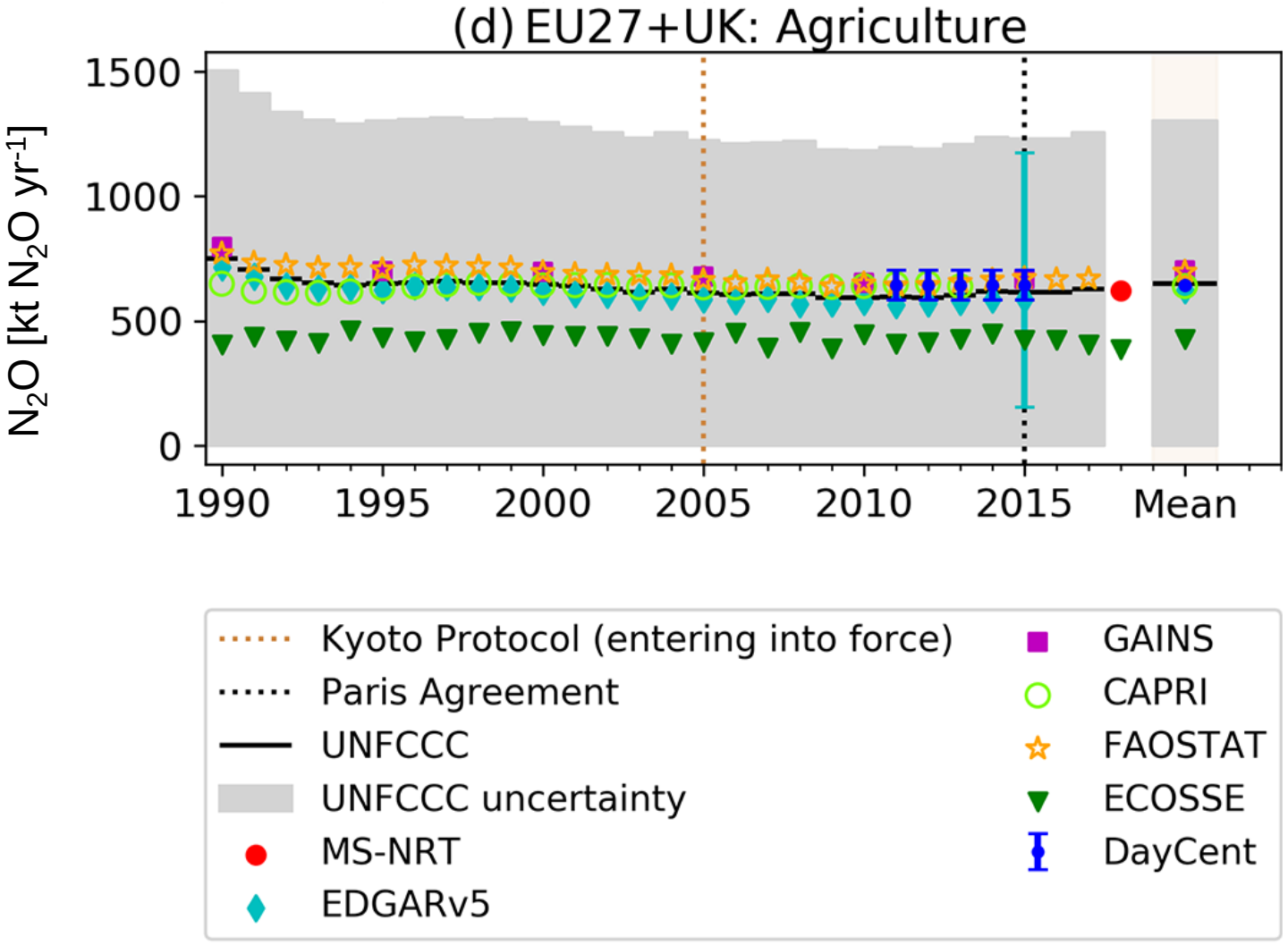
Detailed approach:

- "real" fertilizer data
- Daily time steps
- Crop specific

Simplified approach:

- Estimates for fertilizer data
- monthly time steps
- Generic plant parameters

WP4 - N2O fluxes



WP4 - Conclusion

- **The agriculture sector is the largest source for N_2O emissions**
- **The uncertainty for the N_2O emissions is the largest among the three main greenhouse gases**
- **Nitrogen application rates on fields are main drivers for N_2O emissions on croplands**
- **Robust input data for the management are required for high accuracy in the modelling**

Thank you for your attention.

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