Task Force on Integrated Assessment Modelling

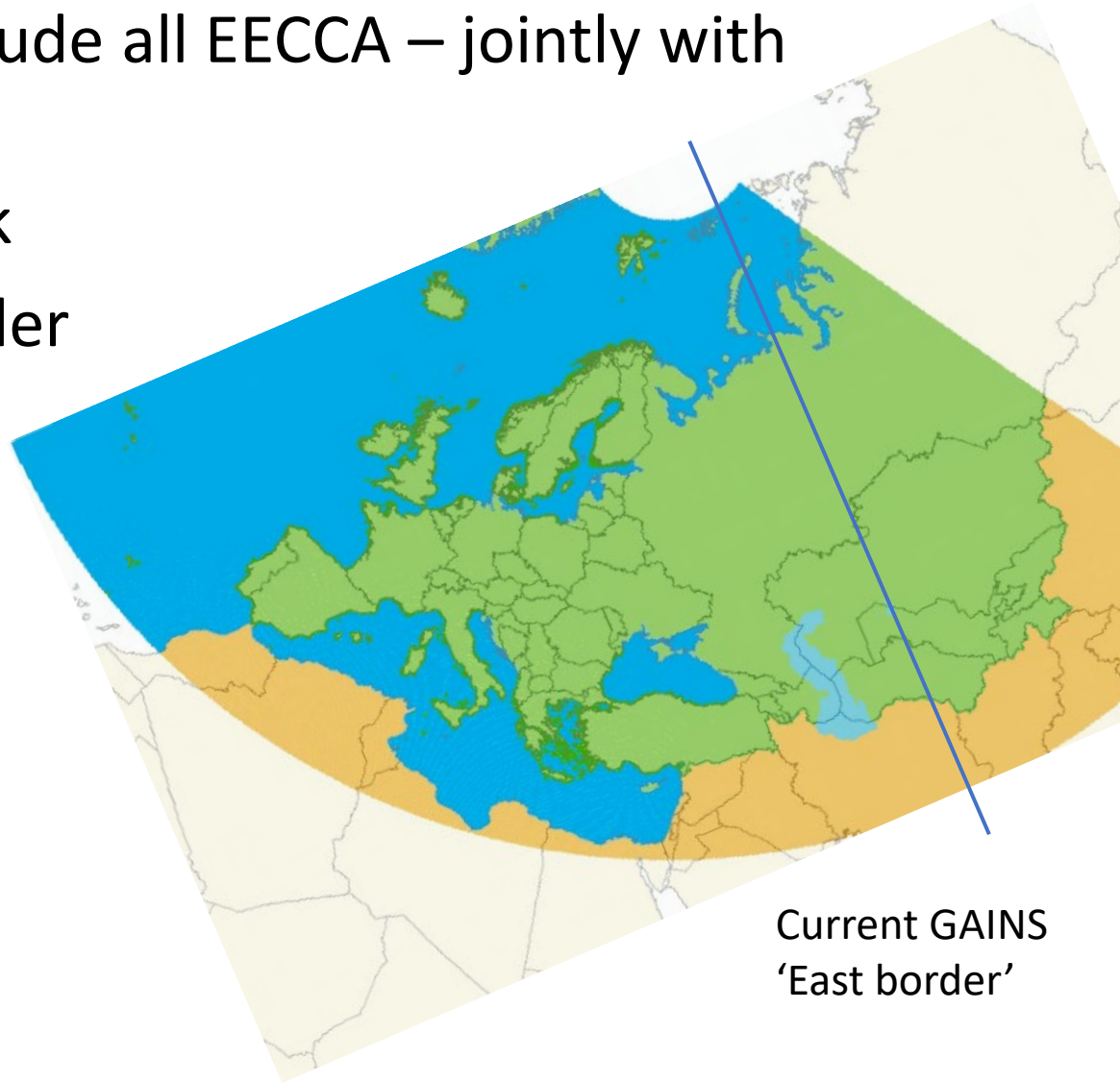
50th Meeting - 21 – 23 April 2021

https://www.iiasa.ac.at/TFIAM

- **Progress in European assessments**, including Clean Air Outlook2 & Scenarios for EECCA/SEE-countries
- **Progress in National assessments**
- **Progress of the TFIAM-workplan**: Ammonia, Costs of Inaction, BC-co-benefits of PM-measures, Clean air in cities
- **Review of the Gothenburg Protocol**: GPG questions; guidance on economic intruments?
- **Lockdown:** impacts on air quality

GAINS improvements in progress

- Extending GAINS model domain to include all EECCA – jointly with MSC-W
- Updated baseline EU-Clean Air Outlook
- Projections for EECCA/SEE - review under EU funded EUCLIMIT-9EAST project
- Condensables
- Local and regional scales

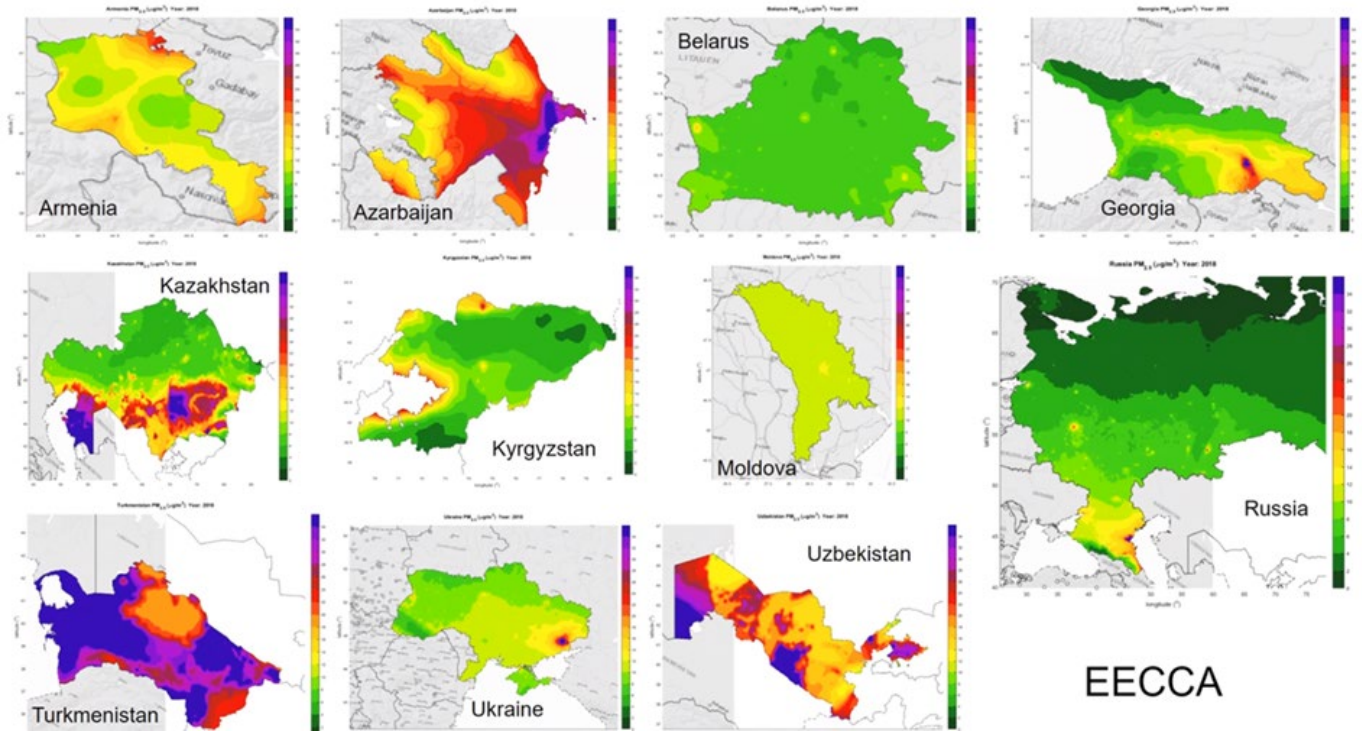


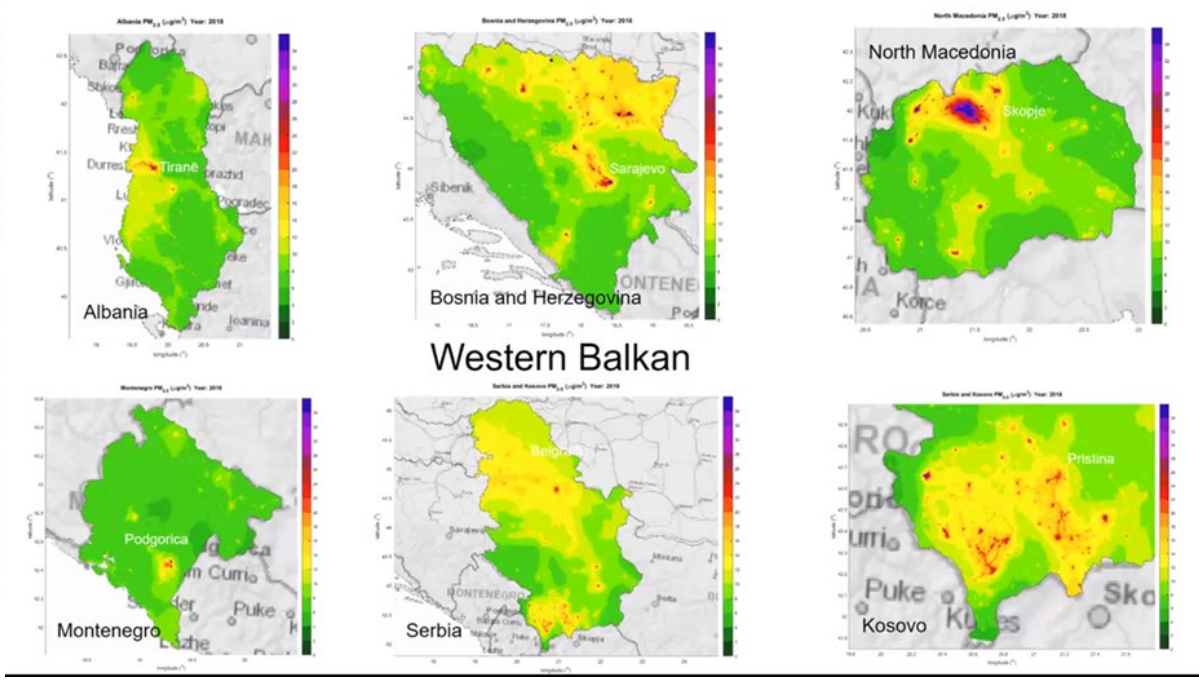
Current GAINS
'East border'

Importance of local and regional scale

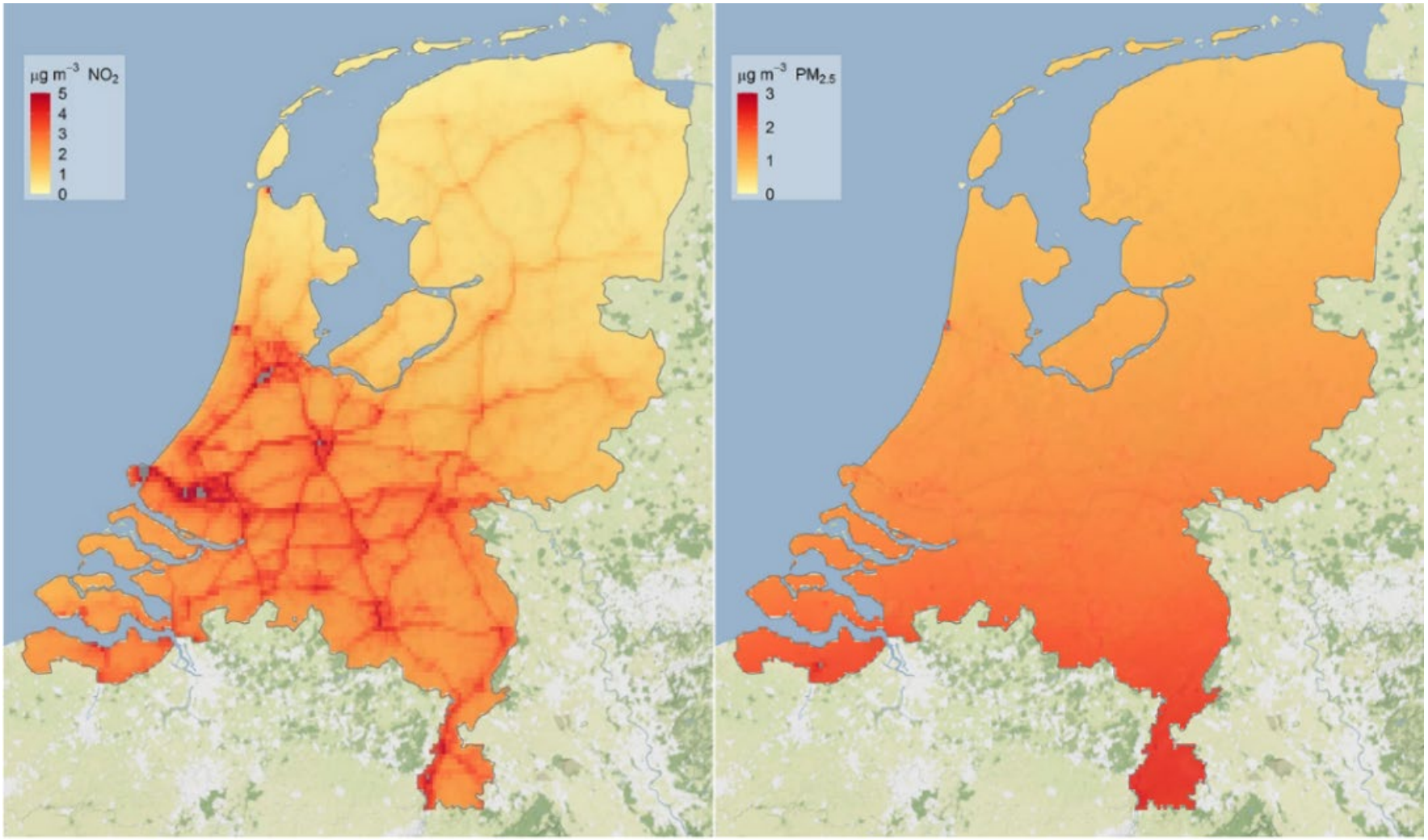
- GAINS will benefit from the fine scale modelling at MSC-W (uEMEP model)

Preliminary PM2.5 concentration calculations with the uEMEP model for EECCA and Western Balkans





Air quality impact of lockdown - spring 2020



Substantial reductions in NO_2-concentrations, less signicifant decrease in PM2.5, increase in ozone

Ammonia Assessment Report

- Ammonia is main cause of exceedances of critical loads of ecosystems
- Ammonia contributes to PM-formation: it is also a health issue
- Only modest emission ammonia reduction reached; and modest future emission reduction ambitions
- 30-50% ammonia reduction is needed in areas with high livestock density
- Costs of inaction exceed costs of measures
- A more efficient use of nitrogen offers co-benefits for air and water quality, climate, biodiversity and health.
- Report available in English, French and Russian
  - ECE_EB.AIR_WG.5_2021_7-2102624E.pdf (unece.org)

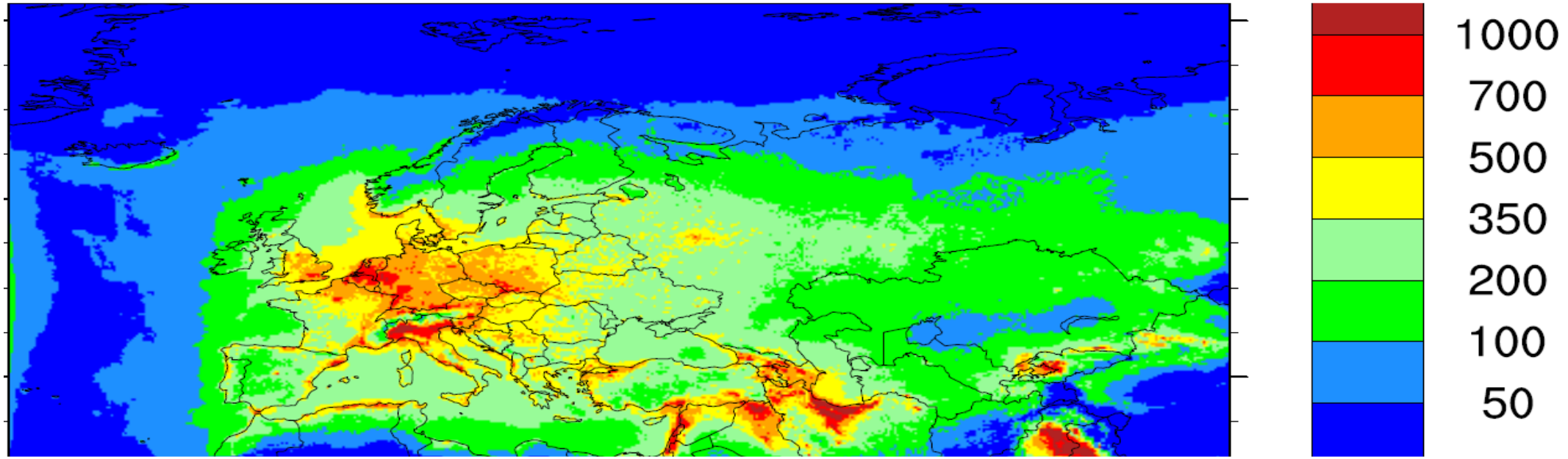
Costs of inaction (1-30 euro/kg) vs action (0-15 euro/kg)

Costs of Inaction	**euro/kg**	
EU-average	10-25	CE-Delft, 2019
Belgium, Netherlands	30	CE-Delft, 2019
Germany	32	Matthey, Bünger, 2018
Denmark	20	Skou Andersen, 2019
UK	1,1-18	Ricardo, 2019
Spain	<10	CE-Delft, 2019
Ireland	0,8	EnvEcon, 2015
Finland	0,7-2,8	Kukkonen, 2019
Costs of measures	euro/kg	
Low emission housing	0,5-1,5	Reis, 2015
Covered manure storage	0,5-1,5	Reis, 2015
Low-emission manure application	0,2-4	Reis, 2015
Air scrubbers	15	Wulf, 2017 ←

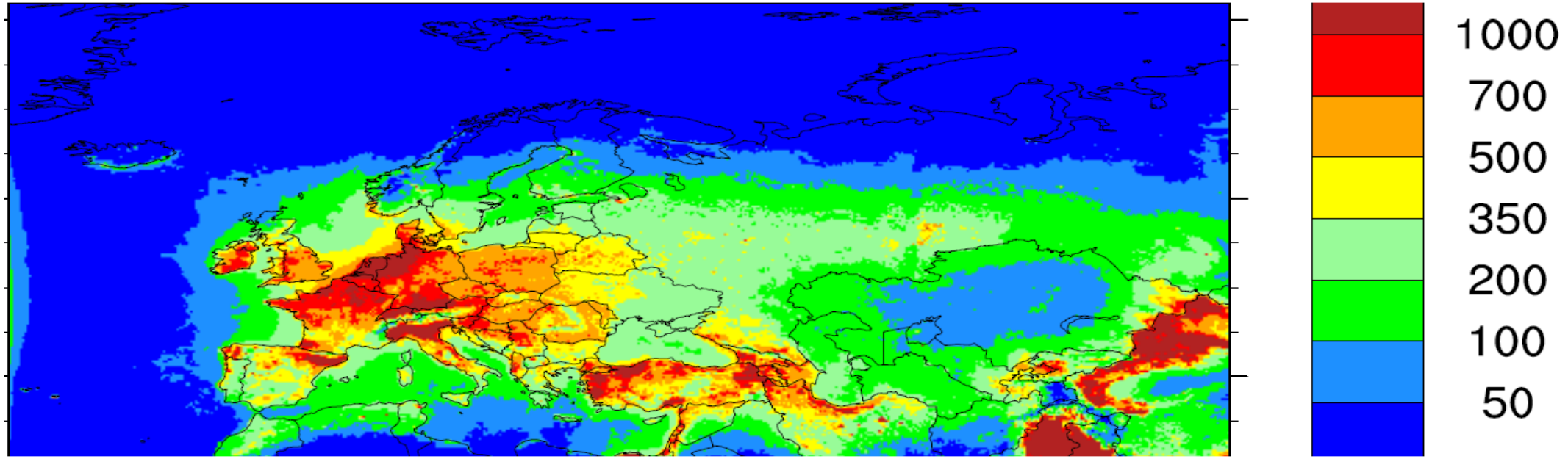
Damage cost approach

Nitrogen deposition

(kg N/km^2)

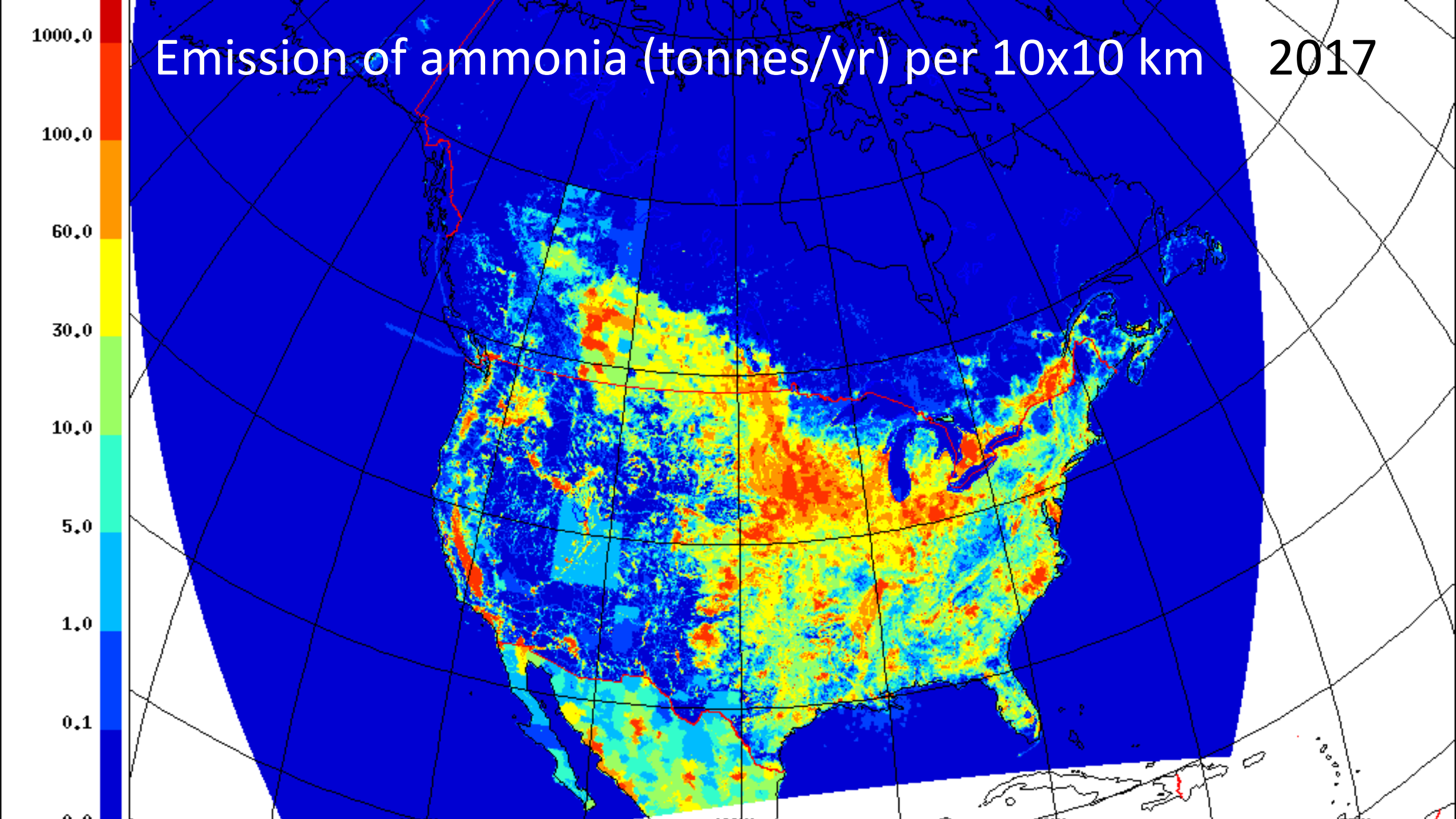


(b) oxidized N



(c) Reduced N

Reduced N dominates !


Emission of ammonia (tonnes/yr) per 10x10 km
2017
1000.0
100.0
60.0
30.0
10.0
5.0
1.0
0.1

Ammonia discussion – further work *(see informal doc 1 – point 7)*

- Less NO_x and SO_2 means that ammonia less effectively forms SIA (EMEP/MSC-W: between 2005 -2030 ~ 35% less effective)
- Increasing reduced nitrogen deposition

- Further scenario analysis in context GP review
- Projections of SIA-formation and nitrogen deposition in EECCA/SEE

PM-measures that also significantly reduce black carbon

- Residential burning of coal and wood
- Open field (agricultural) residue burning
- Scrapping old diesel vehicles & old NRMM
- Industrial emissions (coke ovens, flaring in refineries)
- Cooking (meat frying, BBQs)

Costs of Inaction

1. How large is the monetize damage from air pollution to human health and ecosystems?
   …. more than 20% of GDP in central and eastern Europe
2. How much damage can be avoided by taking action?
   … MTFR + synergy effects
3. Are the benefits larger than the emission control costs?
   … Yes

Cost of inaction on air pollution – Synthesis of current knowledge

Status of the work & project update

The work is financed by Klima- og Miljødepartementet, Norway

TFIAM 50
21-23 April 2021

Stefan Åström, Katarina Yaramenka (IVL),
Rob Maas (RIVM), TFTEI

National Institute for Public Health and the Environment
Ministry of Health, Welfare and Sport

ivl
Swedish Environmental Research Institute