wge Working Group on Effects of the Convention on Long-range Transboundary Air Pollution

AARHUS UNIVERSITY

Impacts of climate change policies on air pollution

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- Climate effects on biodiversity
- Climate effects on Critical Loads
- Synergies and tradeofs
- Non-technical measures LULC

Biodiversity pressures and threats

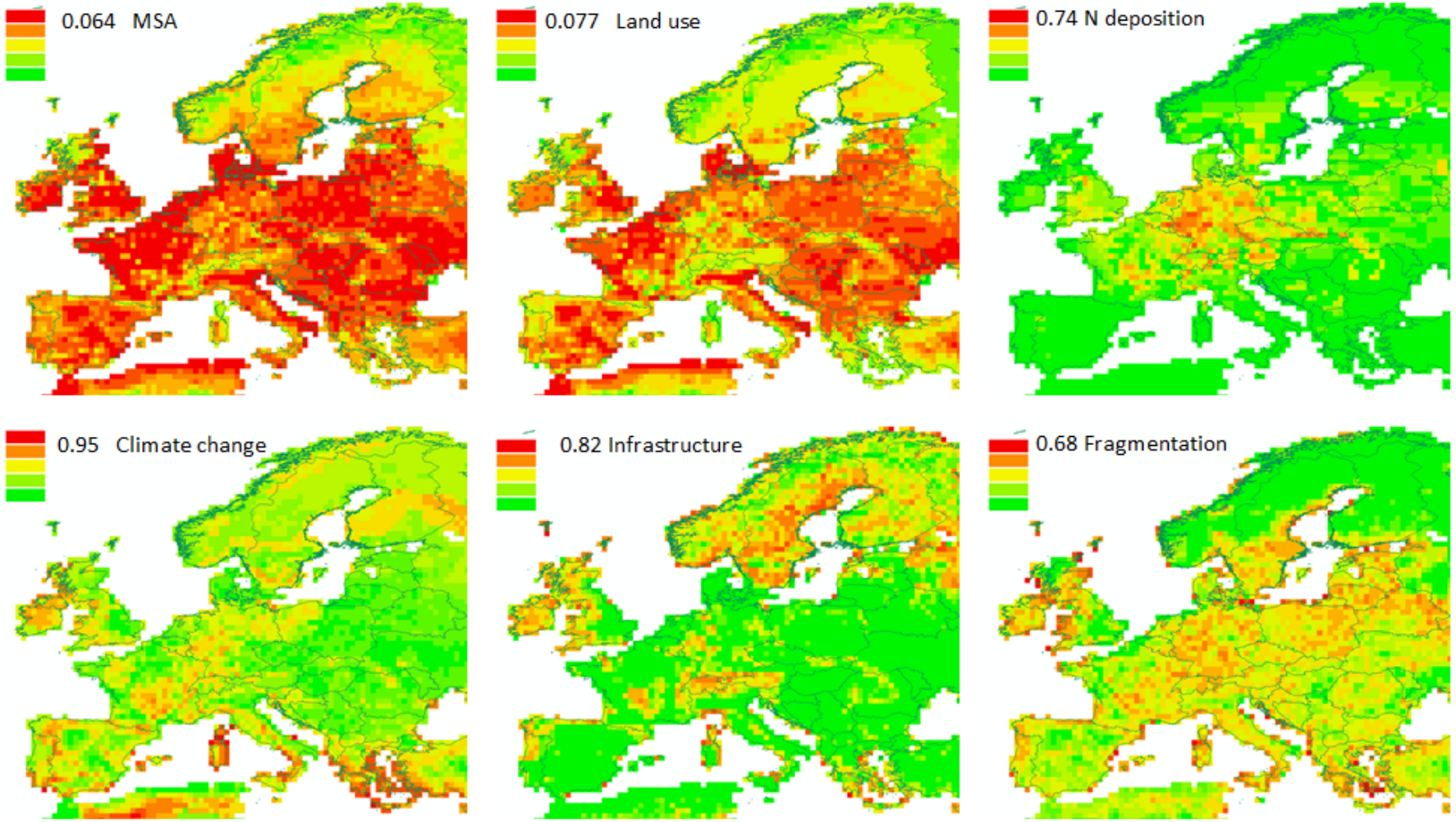
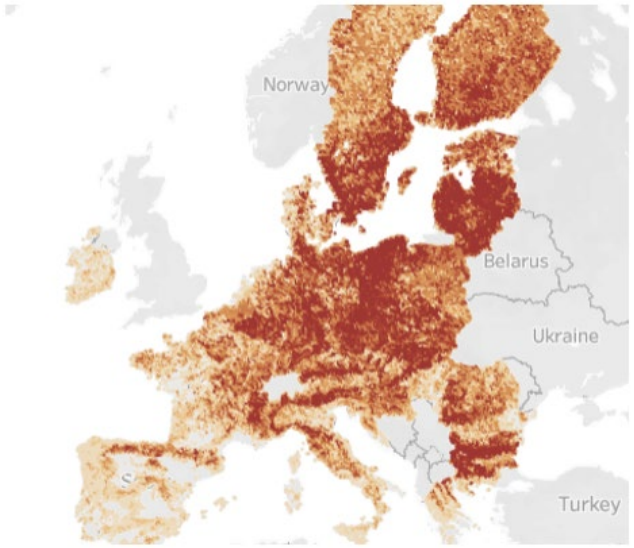


Figure xx. MSA calculated with GLOBIO3 for 2000, both total (upper left) and for land use, N deposition, climate change, infrastructure and fragmentation individually.

Natural grasslands

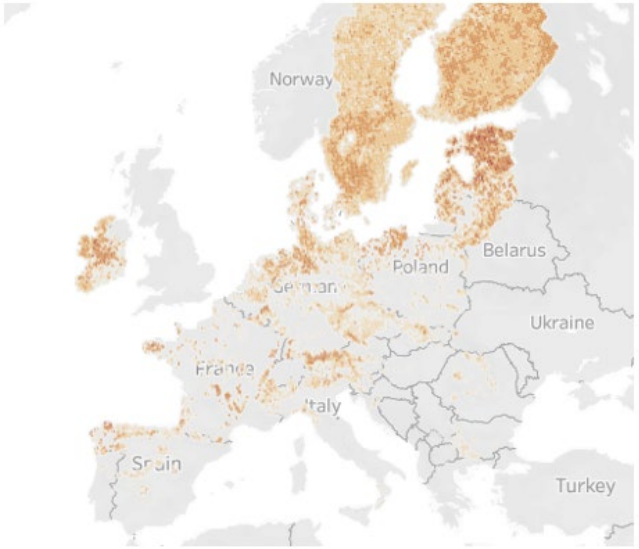
Forests



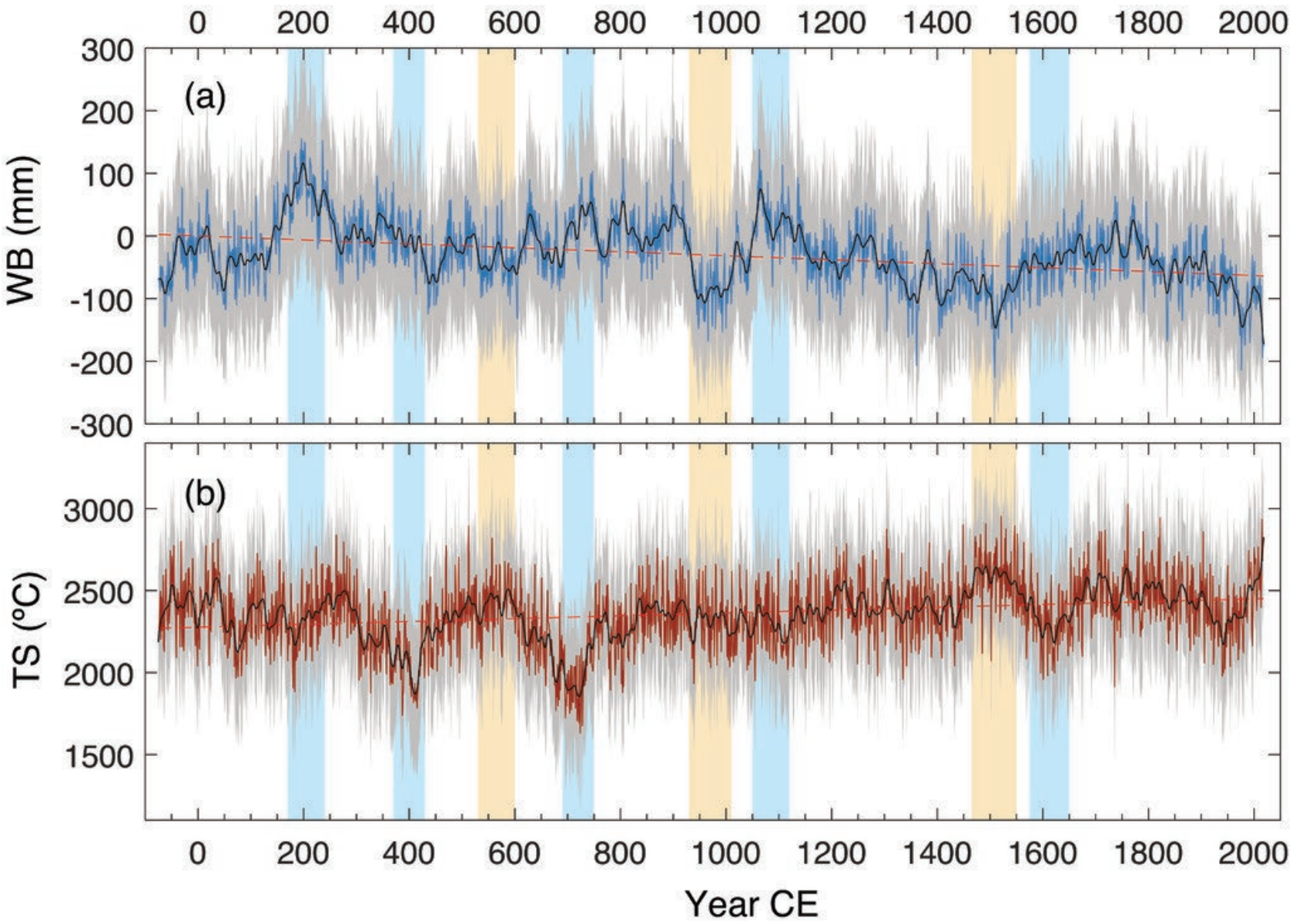
Temporate mountanious coniferous forest

Inland dunes

Acid sphagnum bogs



Examples of distribution areas
For EUNIS level 2 types



Torbenson, M. C. A., and Coauthors, 2023: Central European Agroclimate over the Past 2000 Years. J. Climate, 36, 4429–4441, https://doi.org/10.1175/JCLI-D-22-0831.1

Environment and climate

Effects of Nr include:

Nitrogen leaching in soil and groundwater.

Eutrophication and acidification of terrestrial ecosystems.

Eutrophication of marine ecosystems.

Global warming (N_2O emissions and other effects of nitrogen).

Effects of nitrogen on human health (particulate matter and tropospheric ozone formation).

Nr have a direct impact on the carbon cycle and can have global scale effects on atmospheric fluxes of carbon dioxide (CO_2) and methane (CH_4).

methane affects both environment and climate

Particles and cloud formation

Synergies and tradeofs

o Measures which reduce both ammonia and methane emissions

Examples include the coverage of slurry stores, extracting biogas from slurries, and/or acidification of the slurry. Each of these will reduce emissions of both gases.

Acidification of slurry lowers ammonia emissions by retaining ammonia as ammonium in the slurry, while also inhibiting the activity of the methanogenic bacteria.

The production of biogas from slurries reduce methane and ammonia emissions, so long as low-emission land-spreading techniques are used.

Synergies and tradeofs

o Measures which reduce one pollutant but have no effect on the other

Measures aimed at reducing ammonia emissions from nitrogen fertiliser applications or manure applications to land are not expected to affect methane as these are not significant sources of methane emission.

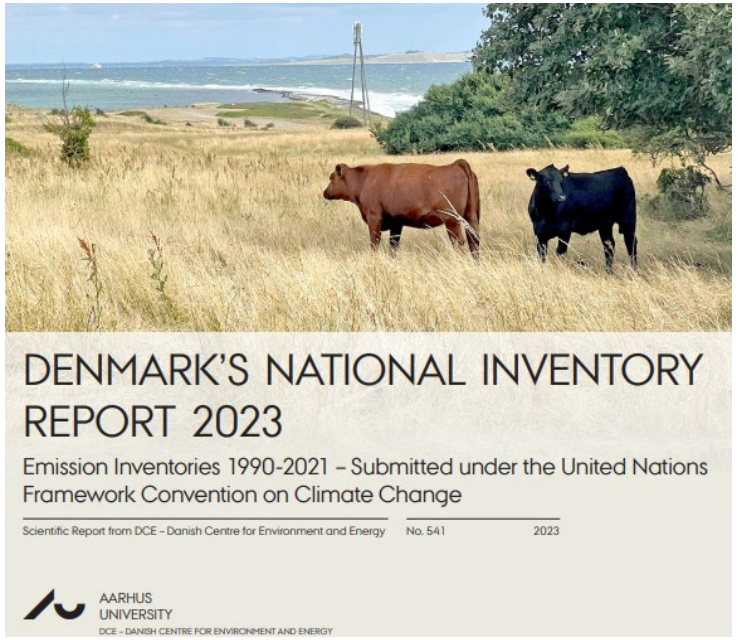
Natural crusting of slurry storage reduces ammonia emissions, but will only have a small benefit in reducing methane emission.

Lowering protein diets for ruminants may decrease N excretion, but, if overall dry matter and fibre intake is similar, there will be little effect on enteric methane emissions.

Novel feed additives may selectively reduce methane emissions.

Reporting

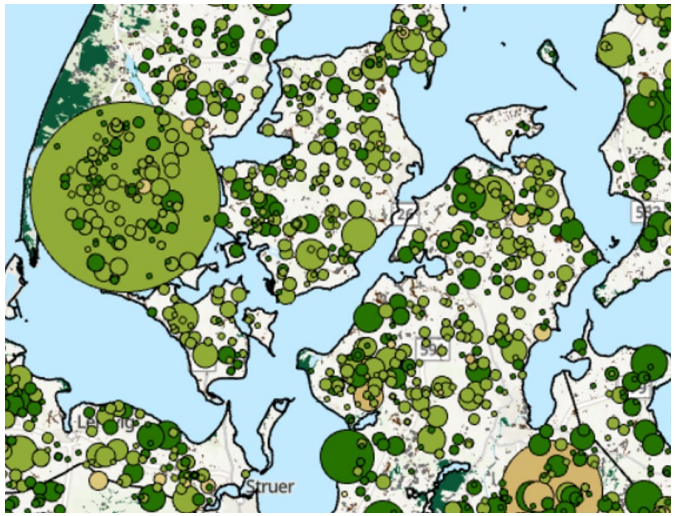
Methane

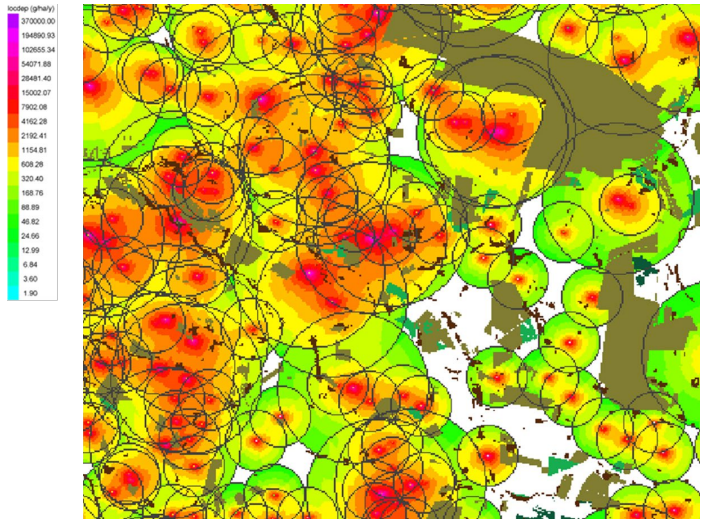


Ammonia

Cooperation with UNFCCC

Air pollution, climate and nitrate leaching together





dtp	emis	udsk	nabo	max exc	exc pt	lok dep	bg dep	cl	cl lav	kat	ntp	afst	ret	CO_2e
	Kg N	Kg N	antal	Kg N	celler	Kg N	Kg N	Kg N	Kg N			m	%	t CO_2e
kvæg	34434	483013	2	0.112	2	0.880	17.8	8	6	4	k1overdrev	2312	62	20241
kvæg	30018	407112	2	0.837	12	1.202	16.5	20	15	1	7230	1395	72	17160
kvæg	29346	318877	0	0.101	3	0.813	13.9	10	5	4	k1hede	1601	91	13350
kvæg	24789	264441	2	0.432	15	0.850	13.8	12	10	6	9190	1991	72	11095
svin	20537	174910	2	0.382	4	0.864	13.1	15	10	6	9999	2129	73	4915