

Analysis of Ecosystem Impacts of the *revised* G-Protocol

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www.rivm.nl/cce

Exceedance (AAE) of Acidity Critical Loads

2005

2010

GP 2020

Exceedance acidity CLs

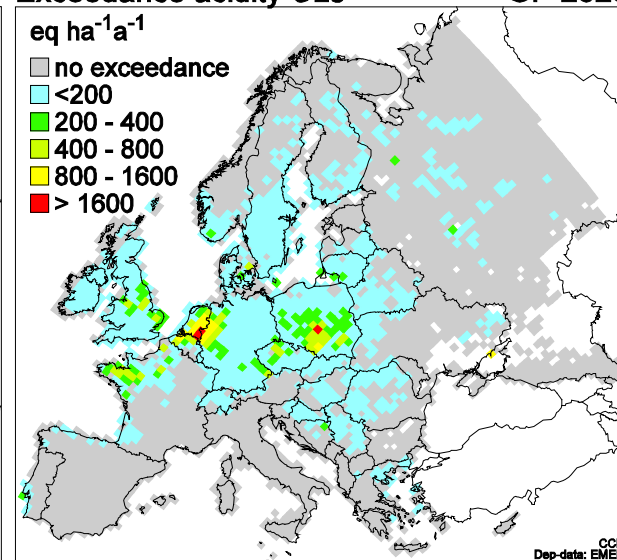
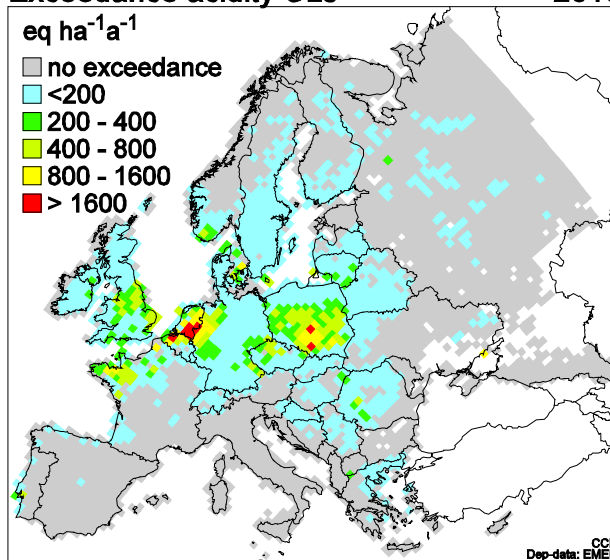
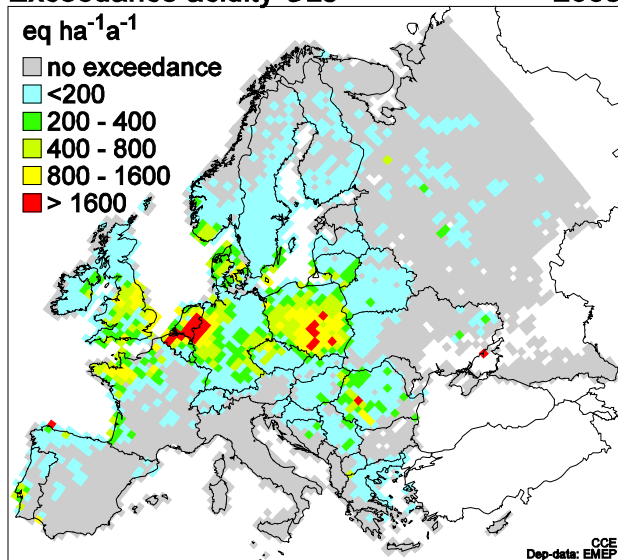
2005

Exceedance acidity CLs

2010

Exceedance acidity CLs

GP 2020



Ecosystem area exceeded:

9.3 (EU27: 17) %

5.7 (9.9) %

4.2 (7.1) %

[2000: 12 (20) %]

Exceedance (AAE) of Eutrophication Critical Loads

2005

2010

GP 2020

Exceedance CLnutN

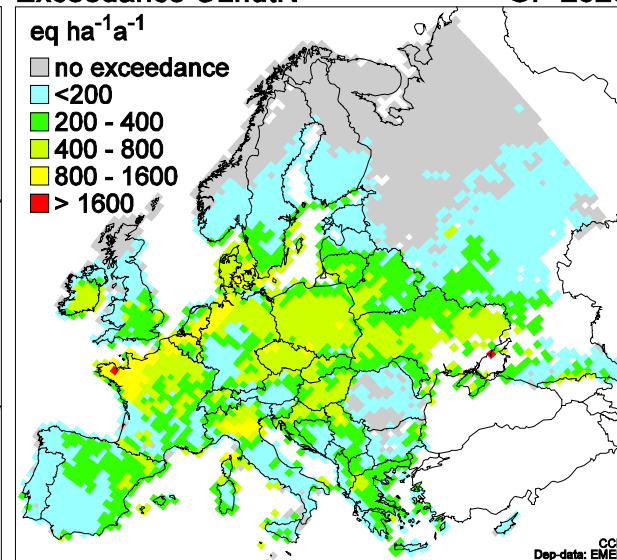
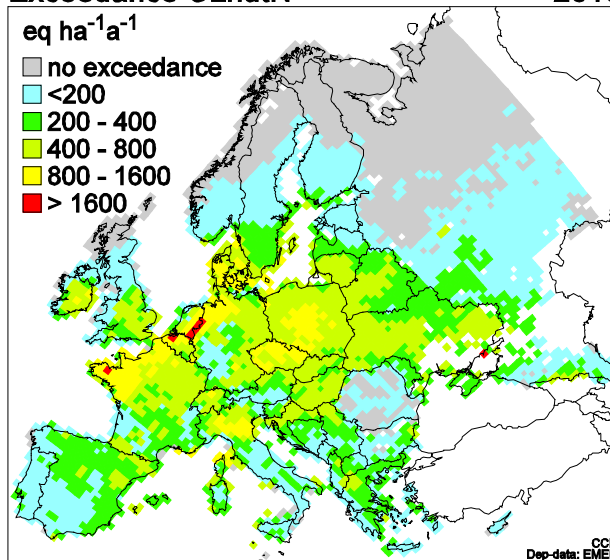
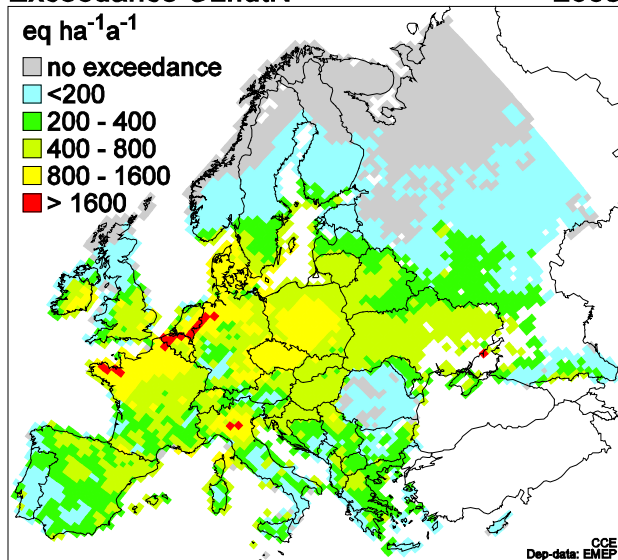
2005

Exceedance CLnutN

2010

Exceedance CLnutN

GP 2020



Ecosystem area exceeded:

51 (EU27: 73) %

45 (68) %

42 (62) %

[2000: 54 (75) %]

Preliminary & tentative!

Change in biodiversity (> 5%) in EUNIS classes E, F2, G3

ca. 2 mill km² (about half of total)

E=grasslands, G2=sub-alpine scrub, G3=coniferous boreal woodland

2005

2010

GP 2020

Change in biodiversity (E,F2,G3)

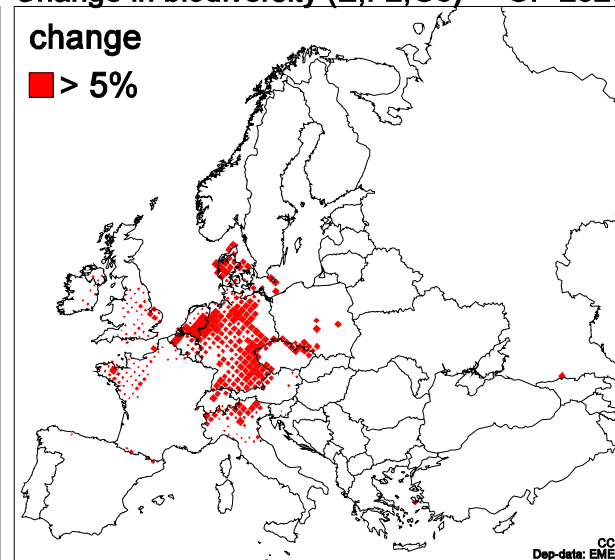
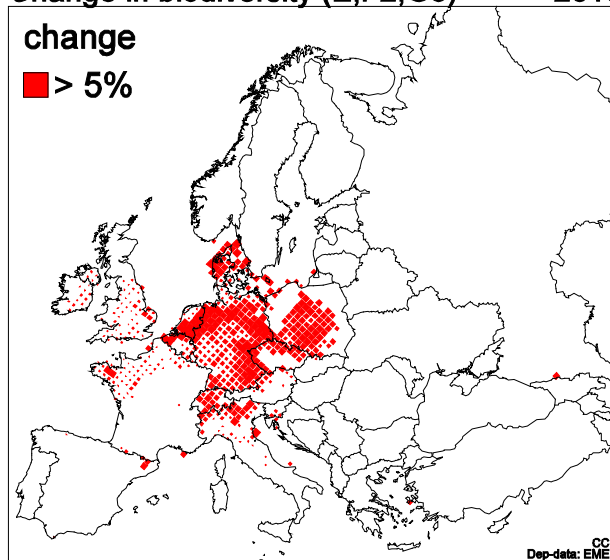
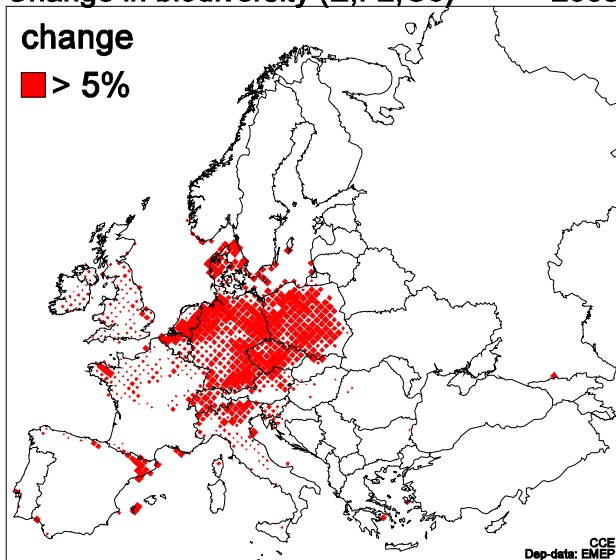
2005

Change in biodiversity (E,F2,G3)

2010

Change in biodiversity (E,F2,G3)

GP 2020



Ecosystem area exceeded:

8.4 (EU27: 13) %

[2000: 10 (16) %]

5.6 (8.7) %

3.3 (5.3) %

Summary/Conclusions

- GP2020 leads to reductions compared to 2010 (everywhere?)
- The reductions are comparable to CLE 2020
- A lot remains to be done with respect to N
- For EU27 there is a chance to do so soon ... 😊

Equitable and 'aspirational' emissions

Possibilities: Consider emissions ...

... per capita

... per euro of GDP

... per km² land area

... ??

Equitable emissions of S and N (GP 2020) with respect to:

1. Equal emissions *per capita* in a country (kg S|N/cap)

Top 5 and Last 5:

	kgS/cap		kgNOx-N/cap		kgNH3-N/cap		kgN/cap
BA	28.794	NO	9.717	IE	21.651	IE	26.457
MK	24.568	RU	8.964	DK	9.565	LU	16.044
CS	21.727	GR	7.941	BY	9.166	DK	14.046
EE	19.247	LU	7.206	LU	8.838	NO	13.541
TR	12.422	FI	6.702	FR	8.600	RU	13.049
		...					
DK	1.378	LT	2.663	SK	3.712	SK	7.401
LV	1.327	RO	2.388	PT	3.666	MT	7.239
AT	1.230	AL	2.042	MD	3.329	BA	6.521
CH	0.863	CH	1.965	MK	3.237	AL	6.515
MD	0.832	MD	1.809	MT	3.150	MD	5.138

Data: Eurostat, populations as of 1 Jan 2009 [2005]

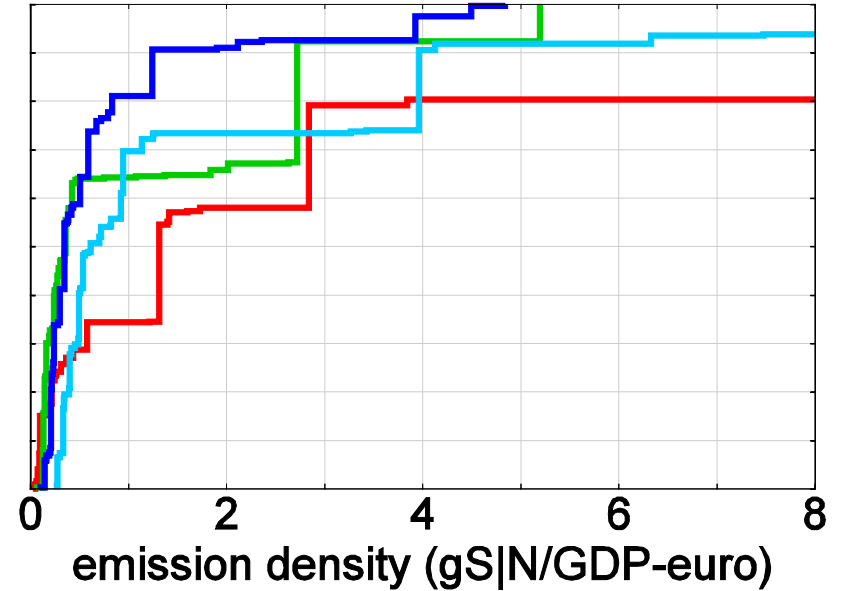
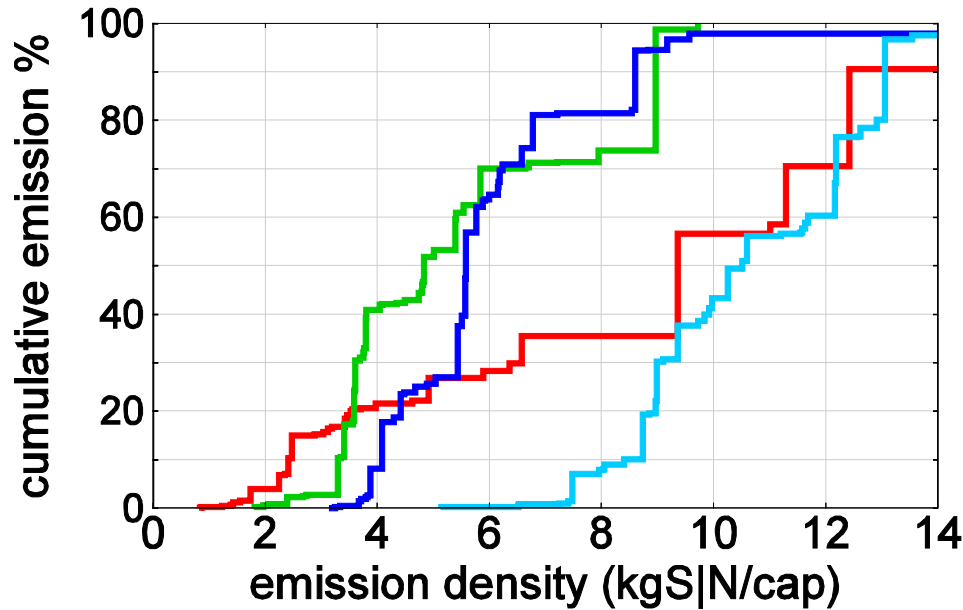
Equitable emissions of S and N (GP 2020) with respect to:

2. Equal emissions *per GDP-euro* in a country (g S|N/GDPeuro)
Top 5 and Last 5:

	gS/euro		gNOx-N/euro		gNH#-N/euro		gN/euro
BA	14.412	UA	5.189	MD	4.838	UA	9.108
UA	10.036	RU	2.716	BY	4.489	MD	7.467
CS	9.117	MD	2.629	UA	3.919	BY	6.322
MK	3.839	CS	2.013	AL	2.352	CS	4.125
RU	2.835	BY	1.833	CS	2.112	RU	3.954
		...					
DK	0.050	GB	0.131	MT	0.180	DE	0.332
NL	0.048	NL	0.129	SE	0.158	SE	0.297
AT	0.044	LU	0.126	LU	0.155	LU	0.280
LU	0.031	DE	0.125	GB	0.141	GB	0.273
CH	0.029	CH	0.066	NO	0.097	CH	0.265

Data: mostly from Eurostat 2005

Countries per capita & per GDP-euro S|N emissions



S: red **NOx-N: green** **NH3-N: blue** **Ntot: turquoise**

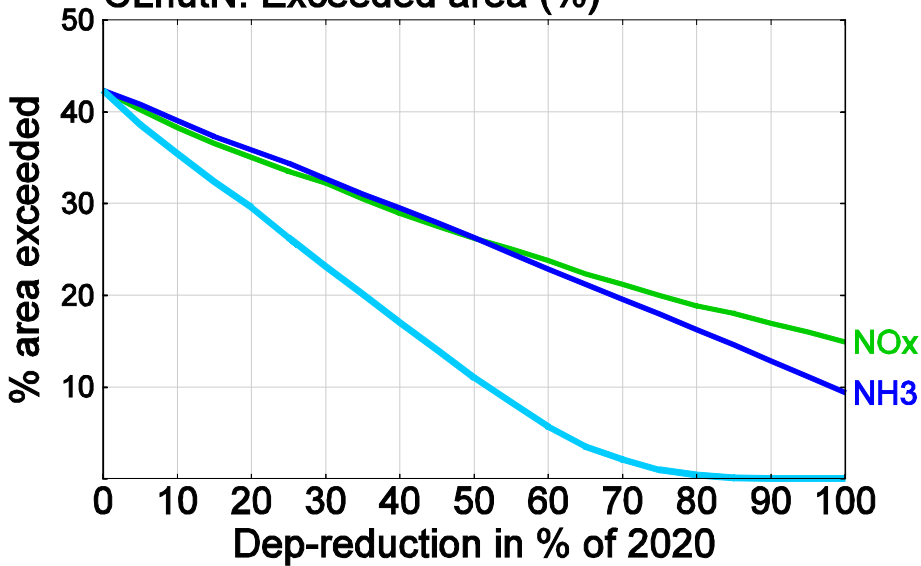
To be continued

Look at impacts of equitable emission reductions ...

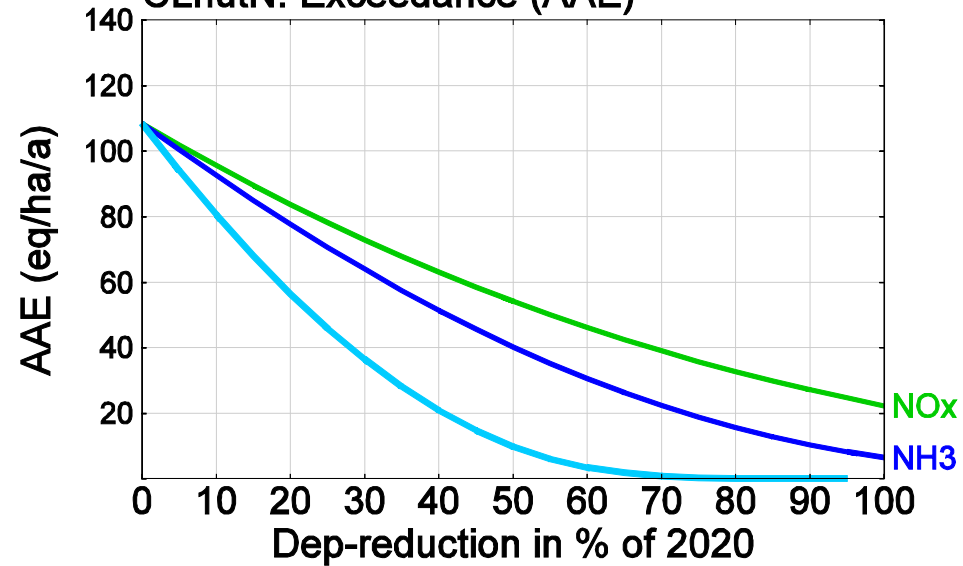
Uniform deposition reductions (1)

Nutrient N CLs:

CLnutN: Exceeded area (%)



CLnutN: Exceedance (AAE)



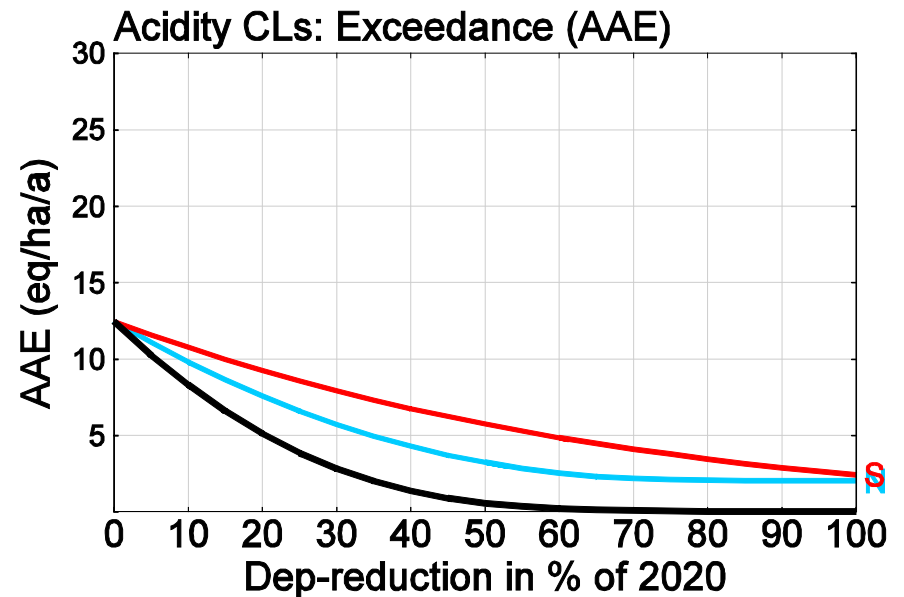
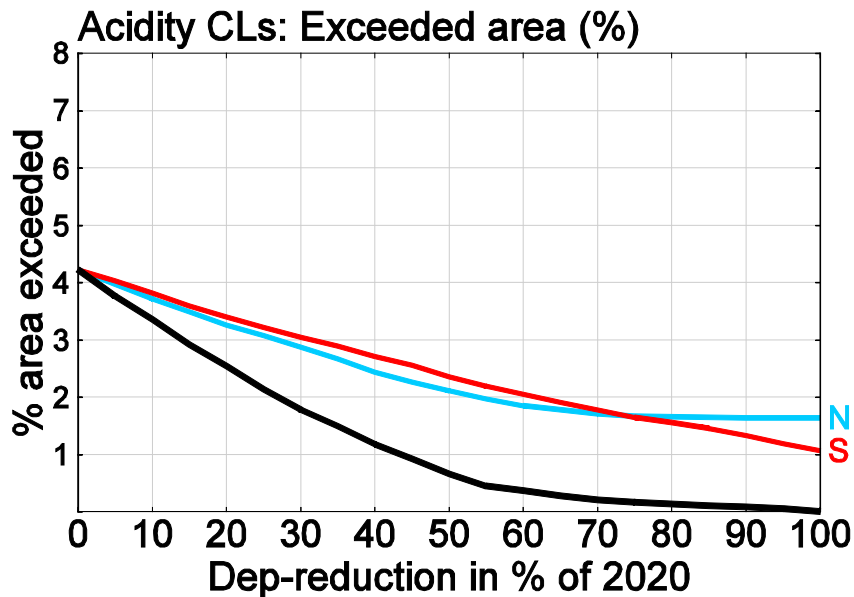
NOx-N: green

NH3-N: blue

Ntot: turquoise

Uniform deposition reductions (2)

Acidity CLs:



S+N: black **S: red** **Ntot: turquoise**

Note much smaller numbers on y-axes!

Caveats:

- Linear EMEP model (transfer matrices) pushed to (beyond) its limits

- ...

Thank you! Questions?

.... But wait a moment ...

Title page of a recent 8-page WGE brochure on impacts of air pollution
(in Russian, French and English)

