Introduction of a simple (!) index to assess intensity and changes in monitoring activities

- Changes over time
- Comparison between Parties

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EMEP-CCC

Year	# countries	# sites	#compounds	#datasets
2000	33	184	213	3681
2005	34	183	319	4721
2010	36	178	322	8131

Based on data submissions

- Number of sites with data reported
- Number of variables reported
- Number of variables having adequate time resolution

✓Major inorganics in precipitation (10 variables)
✓Major inorganics in air (13 variables)
✓Ozone (1 variable)
✓PM mass (2 variables)
✓Heavy metals in precipitation (7 variables)

Compare «actual» number of variables reported with «expected»

Recommended site density Level 1: 1/50000 km2

- Land area -> give «target number» of sites
- Adjustment for countries with very large area and few sites (-> 1/500000 km2)(KZ, RU, TR, UA)
- Not account of marine areas

Example Norway 2005:

Country code	Country	Land area (km2)	50000	#sites_required
NO	Norway	385000	7,7	8

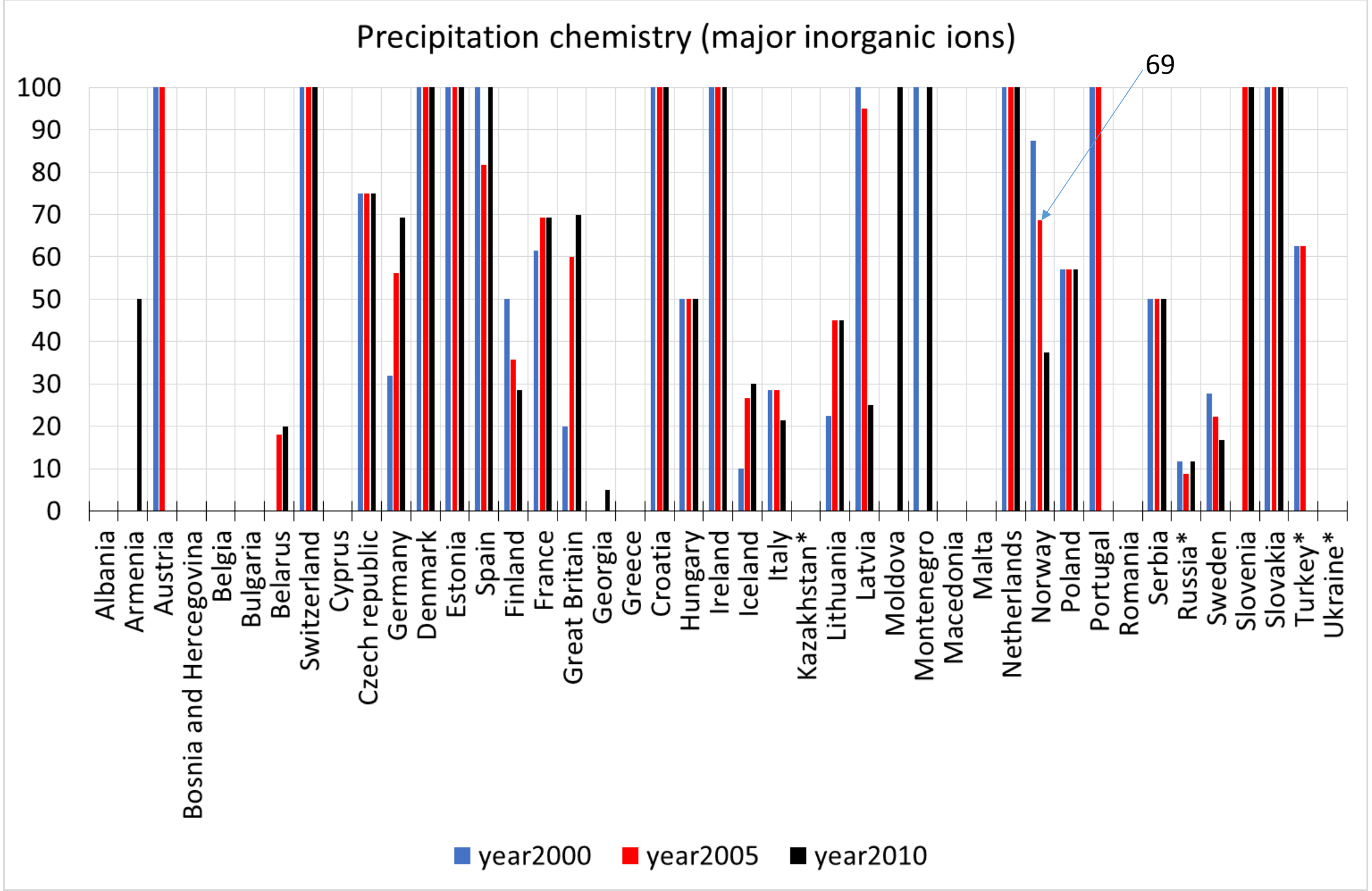
main precip #siteswithdata	main precip #components reported	main precip #components sufficient_time_res
6	60	50

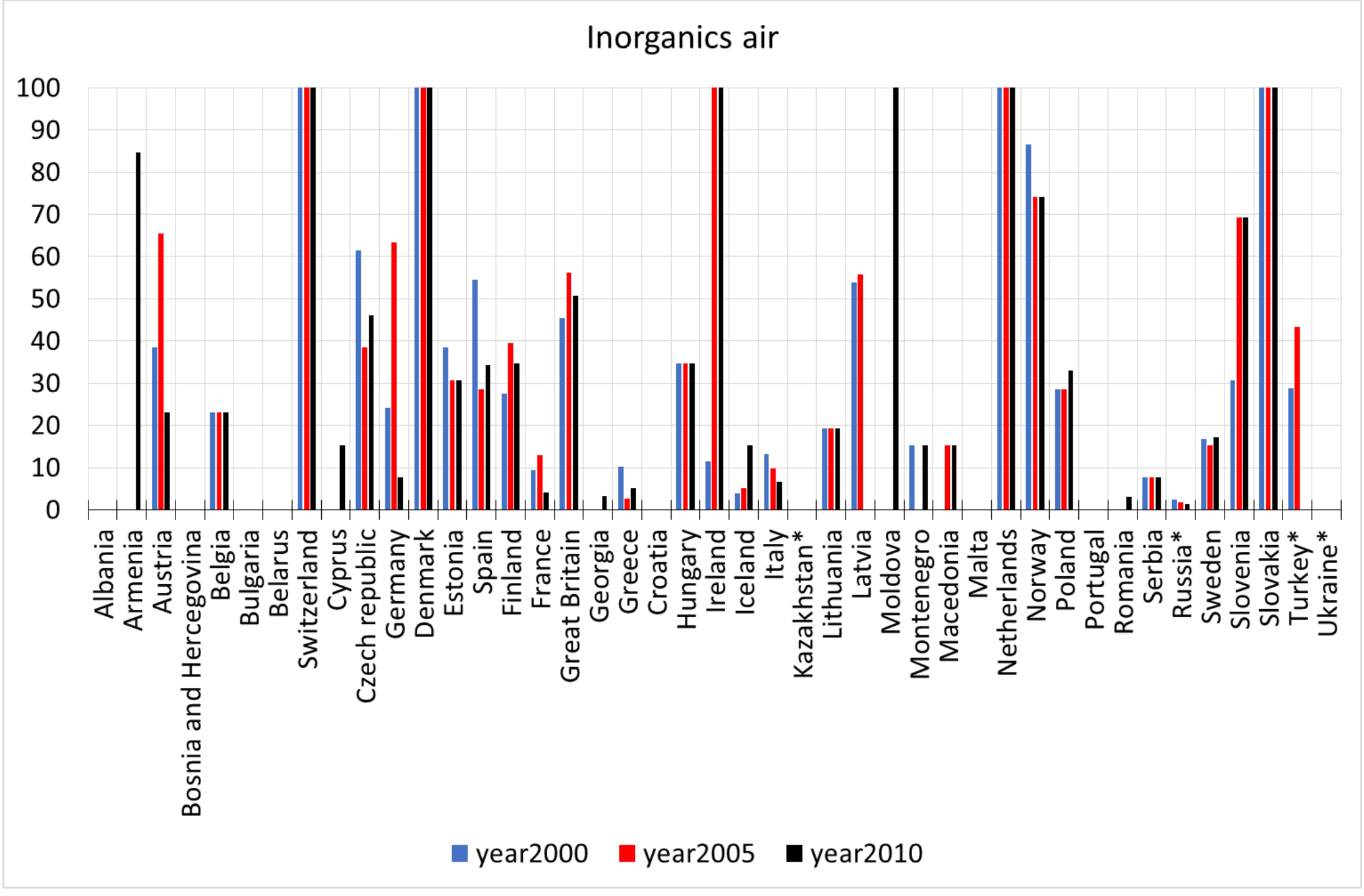
Expected: 8 sites * # variables expected = 80 datasets of precipitation chemistry

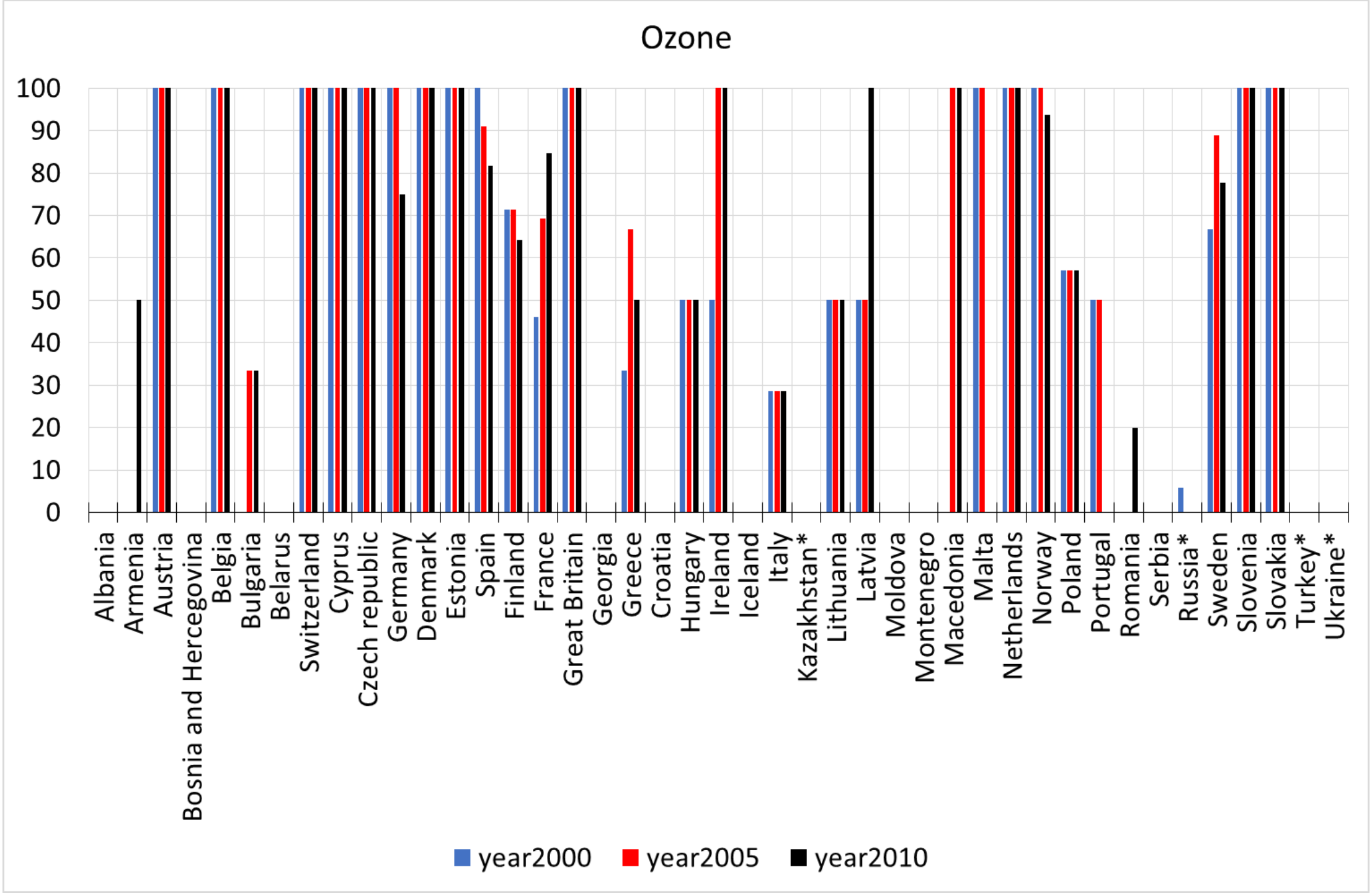
Reported: 60, however only 50 meet requirements wrt time resolution

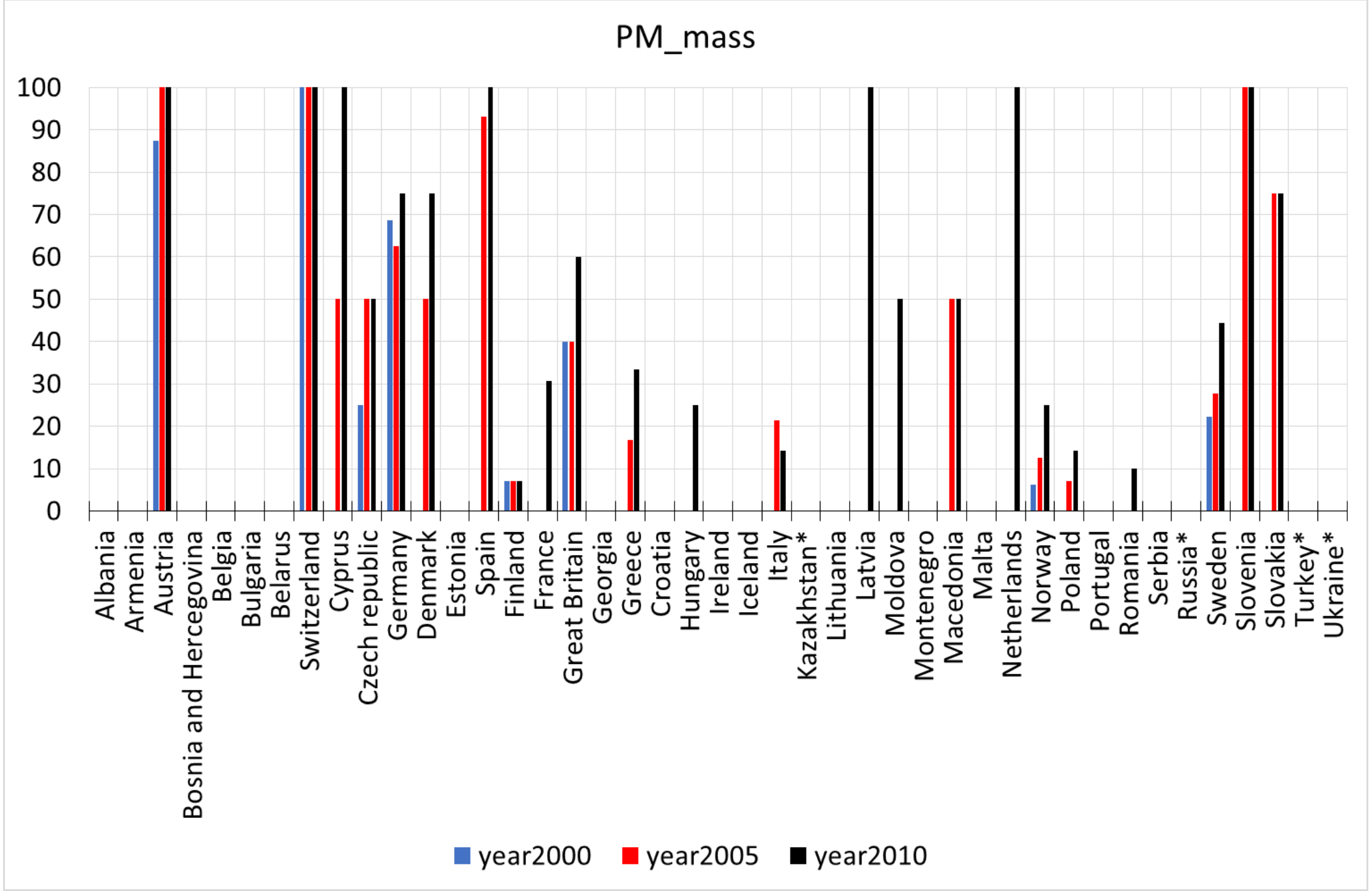
These 10 datasets are given 50% weight: 50 + 10/2 = 55%

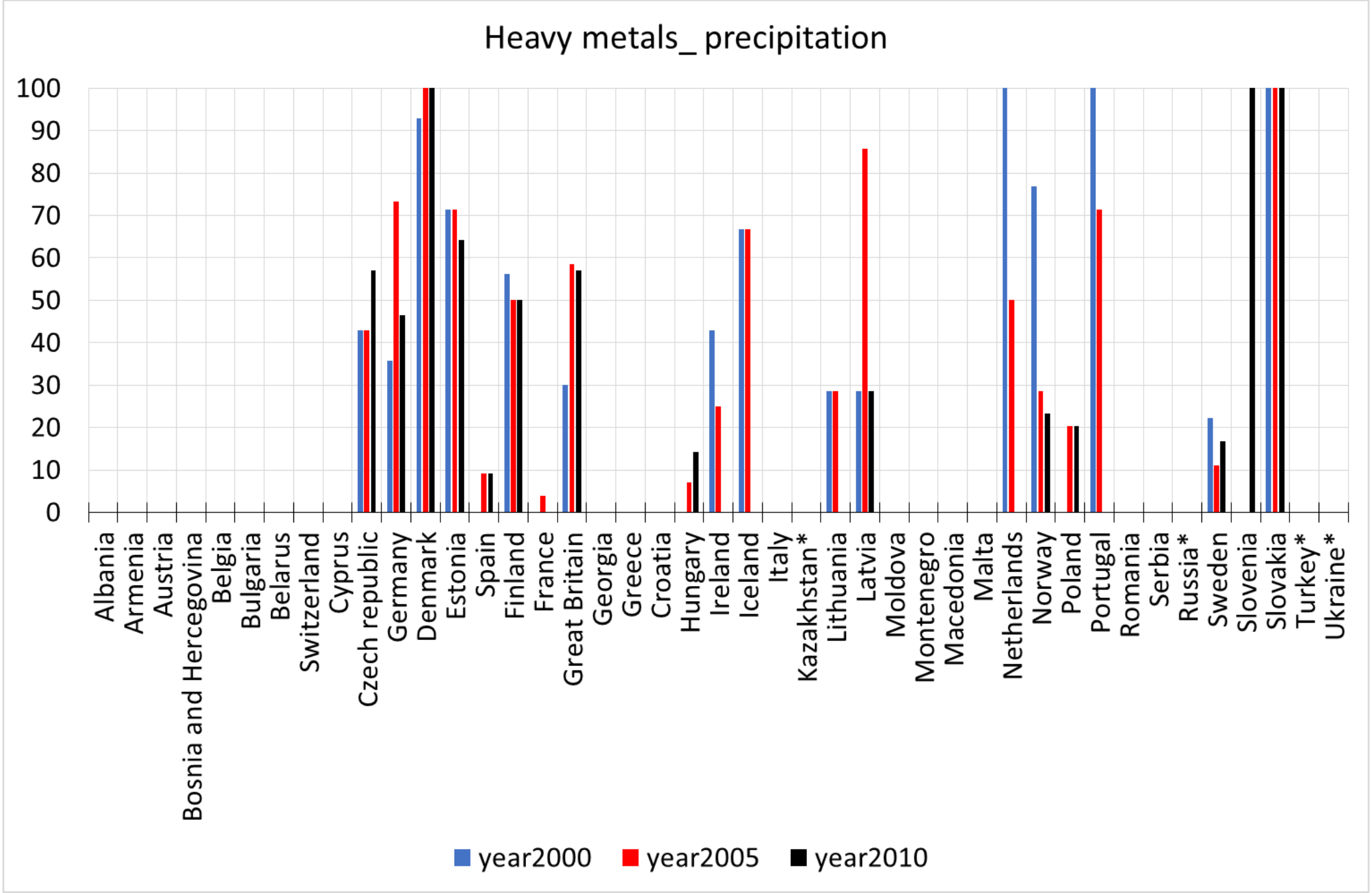
«implementation» = 55/80 = 69%


Precipitation chemistry (major inorganic ions)
69
100
90
80
70
60
50
40
30
20
10
0
Albania
Armenia
Austria
Bosnia and Hercegovina
Belgia
Bulgaria
Belarus
Switzerland
Cyprus
Czech republic
Germany
Denmark
Estonia
Spain
Finland
France
Great Britain
Georgia
Greece
Croatia
Hungary
Ireland
Iceland
Italy
Kazakhstan*
Lithuania
Latvia
Moldova
Montenegro
Macedonia
Malta
Netherlands
Norway
Poland
Portugal
Romania
Serbia
Russia*
Sweden
Slovenia
Slovakia
Turkey*
Ukraine*
year2000
year2005
year2010


Inorganics air
100
90
80
70
60
50
40
30
20
10
0
Albania
Armenia
Austria
Bosnia and Hercegovina
Belgia
Bulgaria
Belarus
Switzerland
Cyprus
Czech republic
Germany
Denmark
Estonia
Spain
Finland
France
Great Britain
Georgia
Greece
Croatia
Hungary
Ireland
Iceland
Italy
Kazakhstan*
Lithuania
Latvia
Moldova
Montenegro
Macedonia
Malta
Netherlands
Norway
Poland
Portugal
Romania
Serbia
Russia*
Sweden
Slovenia
Slovakia
Turkey*
Ukraine*
year2000
year2005
year2010


Ozone
100
90
80
70
60
50
40
30
20
10
0
Albania
Armenia
Austria
Bosnia and Hercegovina
Belgia
Bulgaria
Belarus
Switzerland
Cyprus
Czech republic
Germany
Denmark
Estonia
Spain
Finland
France
Great Britain
Georgia
Greece
Croatia
Hungary
Ireland
Iceland
Italy
Kazakhstan*
Lithuania
Latvia
Moldova
Montenegro
Macedonia
Malta
Netherlands
Norway
Poland
Portugal
Romania
Serbia
Russia*
Sweden
Slovenia
Slovakia
Turkey*
Ukraine*
year2000
year2005
year2010


PM_mass
100
90
80
70
60
50
40
30
20
10
0
Albania
Armenia
Austria
Bosnia and Hercegovina
Belgia
Bulgaria
Belarus
Switzerland
Cyprus
Czech republic
Germany
Denmark
Estonia
Spain
Finland
France
Great Britain
Georgia
Greece
Croatia
Hungary
Ireland
Iceland
Italy
Kazakhstan*
Lithuania
Latvia
Moldova
Montenegro
Macedonia
Malta
Netherlands
Norway
Poland
Portugal
Romania
Serbia
Russia*
Sweden
Slovenia
Slovakia
Turkey*
Ukraine*
year2000
year2005
year2010


Heavy metals_ precipitation
100
90
80
70
60
50
40
30
20
10
0
Albania
Armenia
Austria
Bosnia and Hercegovina
Belgia
Bulgaria
Belarus
Switzerland
Cyprus
Czech republic
Germany
Denmark
Estonia
Spain
Finland
France
Great Britain
Georgia
Greece
Croatia
Hungary
Ireland
Iceland
Italy
Kazakhstan*
Lithuania
Latvia
Moldova
Montenegro
Macedonia
Malta
Netherlands
Norway
Poland
Portugal
Romania
Serbia
Russia*
Sweden
Slovenia
Slovakia
Turkey*
Ukraine*
year2000
year2005
year2010

Simplifying (?) going from % implementation to an index

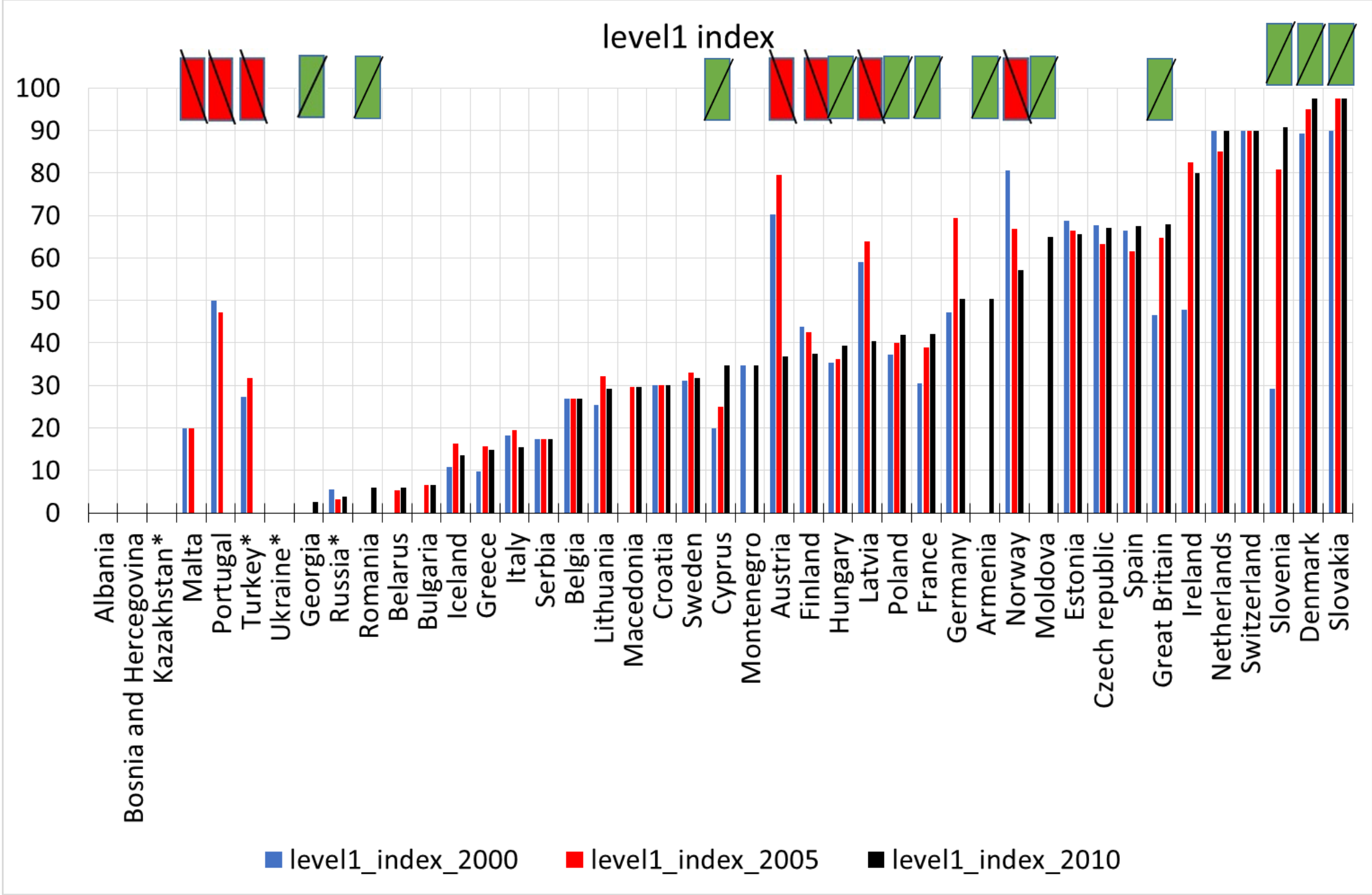
Based on relative implementation, assuming the following weights:

- ✓ Inorganics in precipitation: 30%
- ✓ Inorganics in air: 30%
- ✓ Ozone: 20%
- ✓ PM mass: 10%
- ✓ Heavy metals: 10%

«implementation» limited to 100%

Example Norway 2005:

(0,3 * 63%) + (0,3 * 74%) + (0,2 * 100%) + (0,1 * 13%) + (0,1 * 29%) = 65

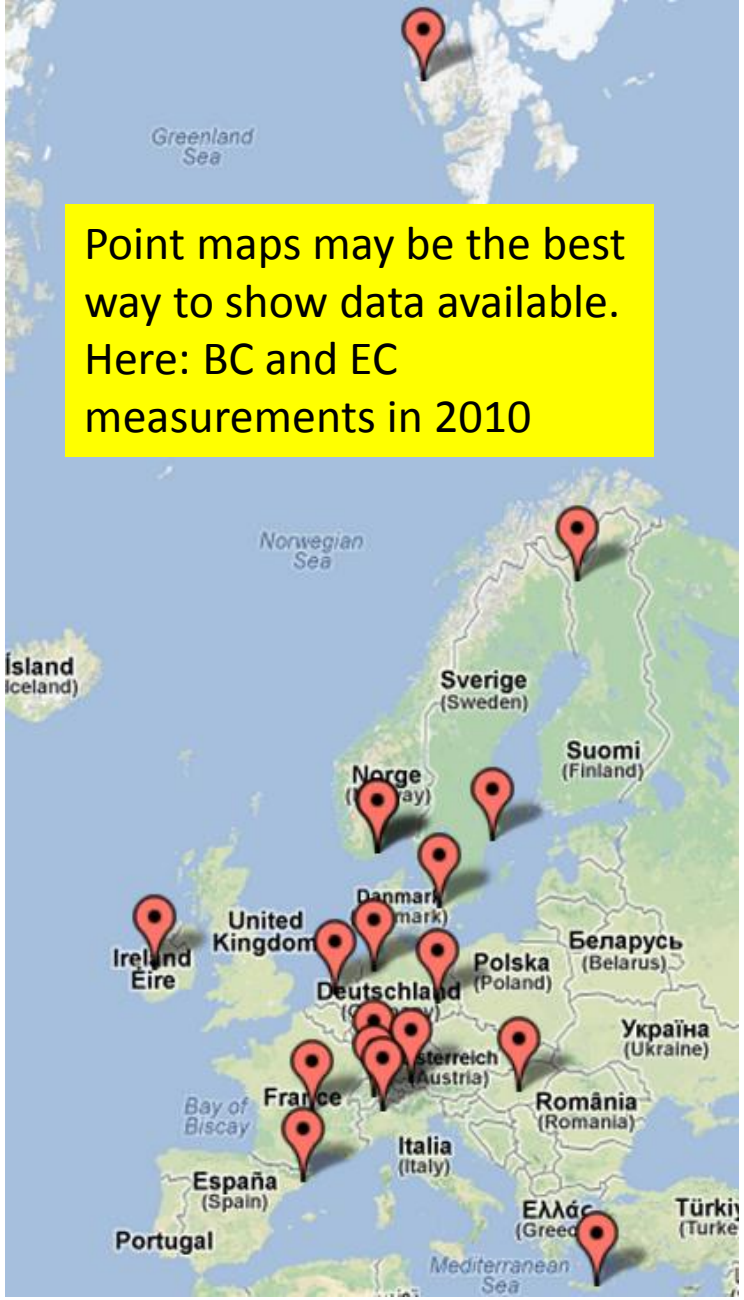

level1 index
100
90
80
70
60
50
40
30
20
10
0
Albania
Bosnia and Hercegovina
Kazakhstan*
Malta
Portugal
Turkey*
Ukraine*
Georgia
Russia*
Romania
Belarus
Bulgaria
Iceland
Greece
Italy
Serbia
Belgia
Lithuania
Macedonia
Croatia
Sweden
Cyprus
Montenegro
Austria
Finland
Hungary
Latvia
Poland
France
Germany
Armenia
Norway
Moldova
Estonia
Czech republic
Spain
Great Britain
Ireland
Netherlands
Switzerland
Slovenia
Denmark
Slovakia
level1_index_2000
level1_index_2005
level1_index_2010

Level 2:

- More difficult to assess due to larger heterogenity
  - In particular «time resolution» (campaigns etc)
  - Many variables/compounds
  - Long-term committment is partially lacking (often relies on research funding)

- Example of a first attempt shown on next slide, but more work is needed

Point maps may be the best way to show data available. Here: BC and EC measurements in 2010



Conclusions:

- Implementation of Level1 still an issue
- Need for increased awareness at SB level
  - Plots of implementation index to be presented in data reports and at SB sessions
- Level2 activities need strengthening
  - campaigns vs continuous
  - Post ACTRIS, need for relevant international research calls, etc.