FAIRMODE CT 8: Exposure and exceedance indicators –

Feedback on Exceedance Situation Indicators (ESI)

Florian Pfäfflin

IVU Umwelt GmbH, Freiburg, Germany

Fairmode technical meeting: Oslo 18-20/10/2022 (Online-Intervention)

ESI for Planning - Road length indicator

- CT8-Guidance
  „The road length indicator is very much connected to exceedances observed in traffic stations. Despite its seemingly simple definition, the estimation can be very sensitive to the assessment methodology (e.g. which road link network is used). The indicator is expressed as a length in m or km. Therefore, **this road length is not recommended as default ESI indicator** because is not easily comparable. It could be retained as voluntary information for very localized exceedances in traffic stations."

ESI for Planning - Road length indicator

- CT8-Guidance
  „The road length indicator is very much connected to exceedances observed in traffic stations. Despite its seemingly simple definition, the estimation can be very sensitive to the assessment methodology (e.g. which road link network is used). The indicator is expressed as a length in m or km. Therefore, **this road length is not recommended as default ESI indicator** because is not easily comparable. It could be retained as voluntary information for very localized exceedances in traffic stations."
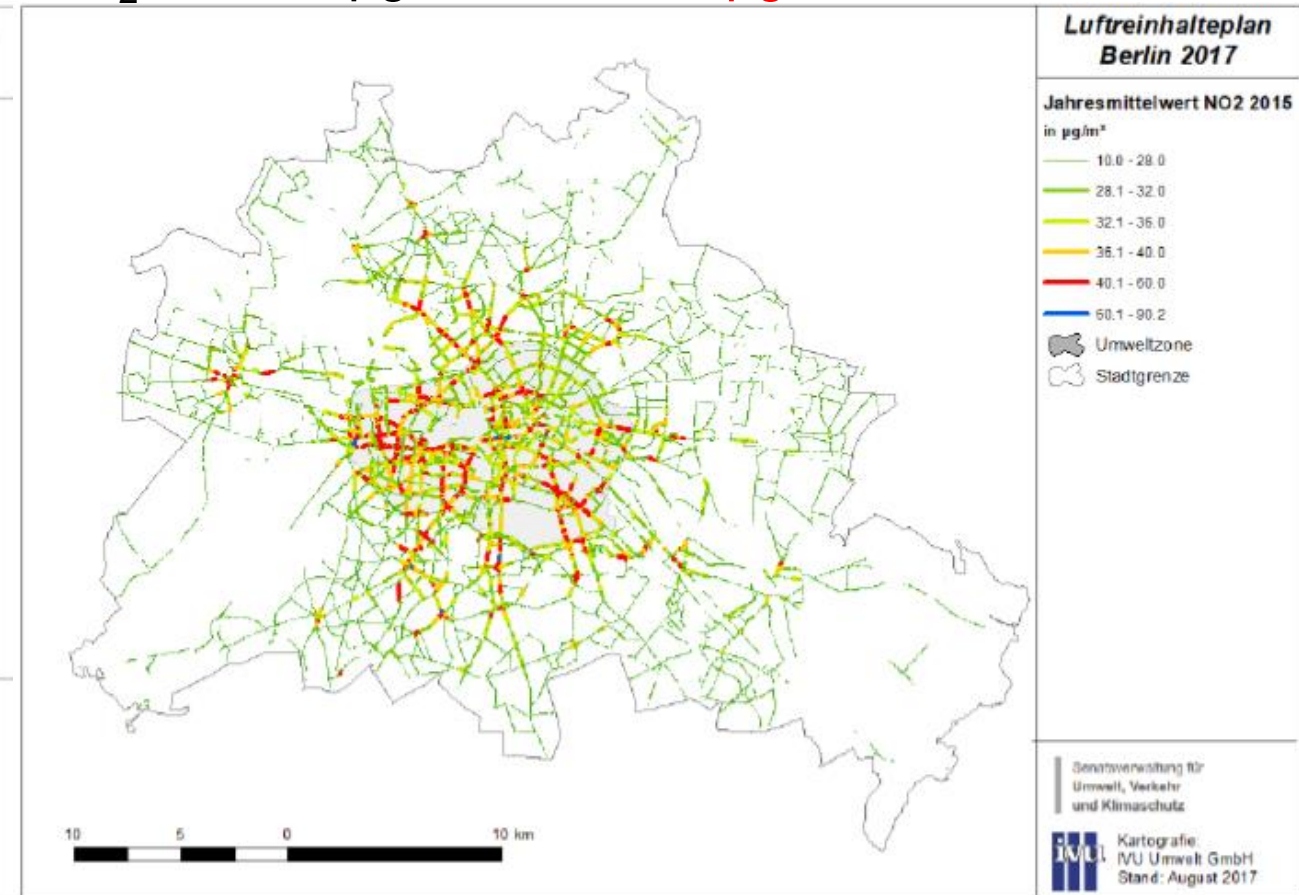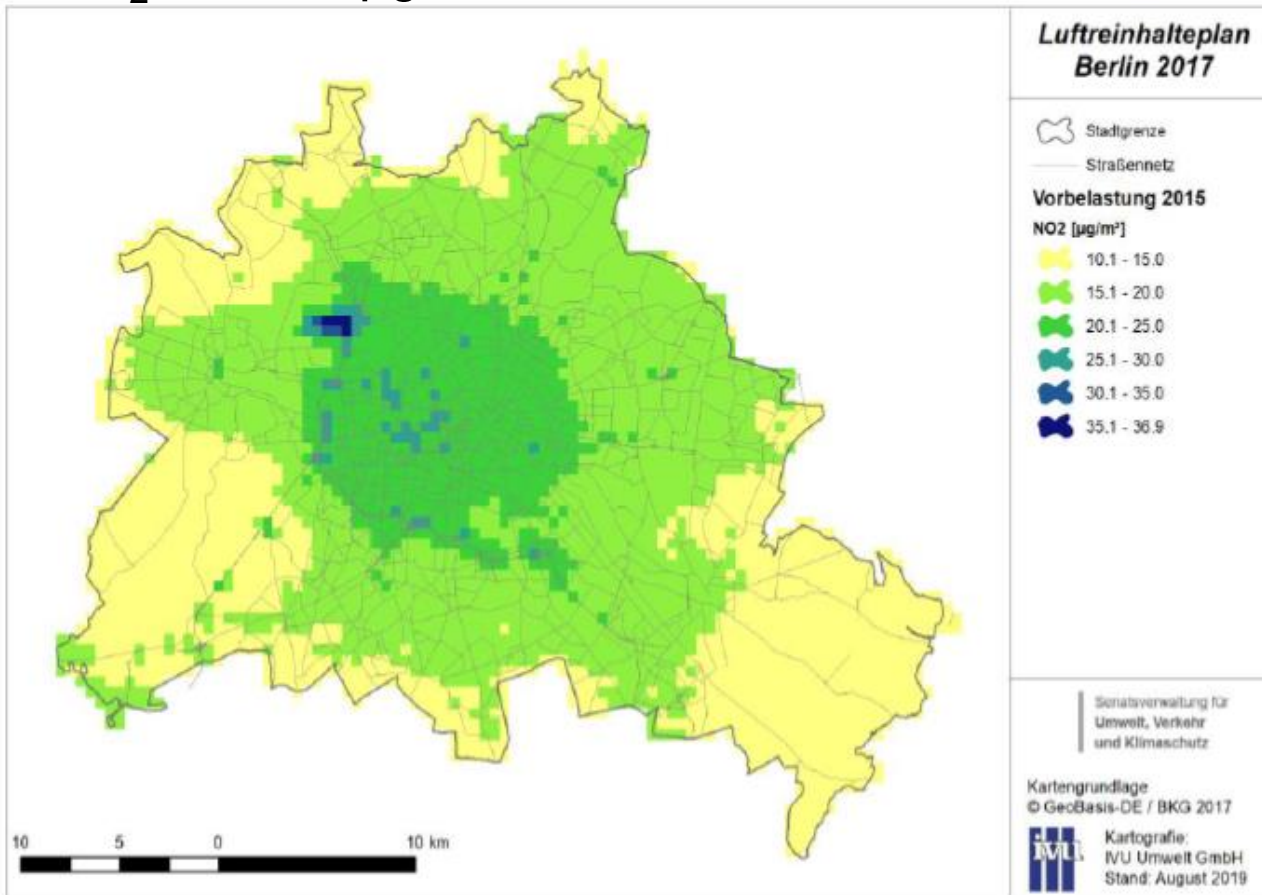
Example: Clean Air Plan Berlin 2018-2025

Modelling

urban background in 500m grid resolution
NO_2: 10 - 37 µg/m³
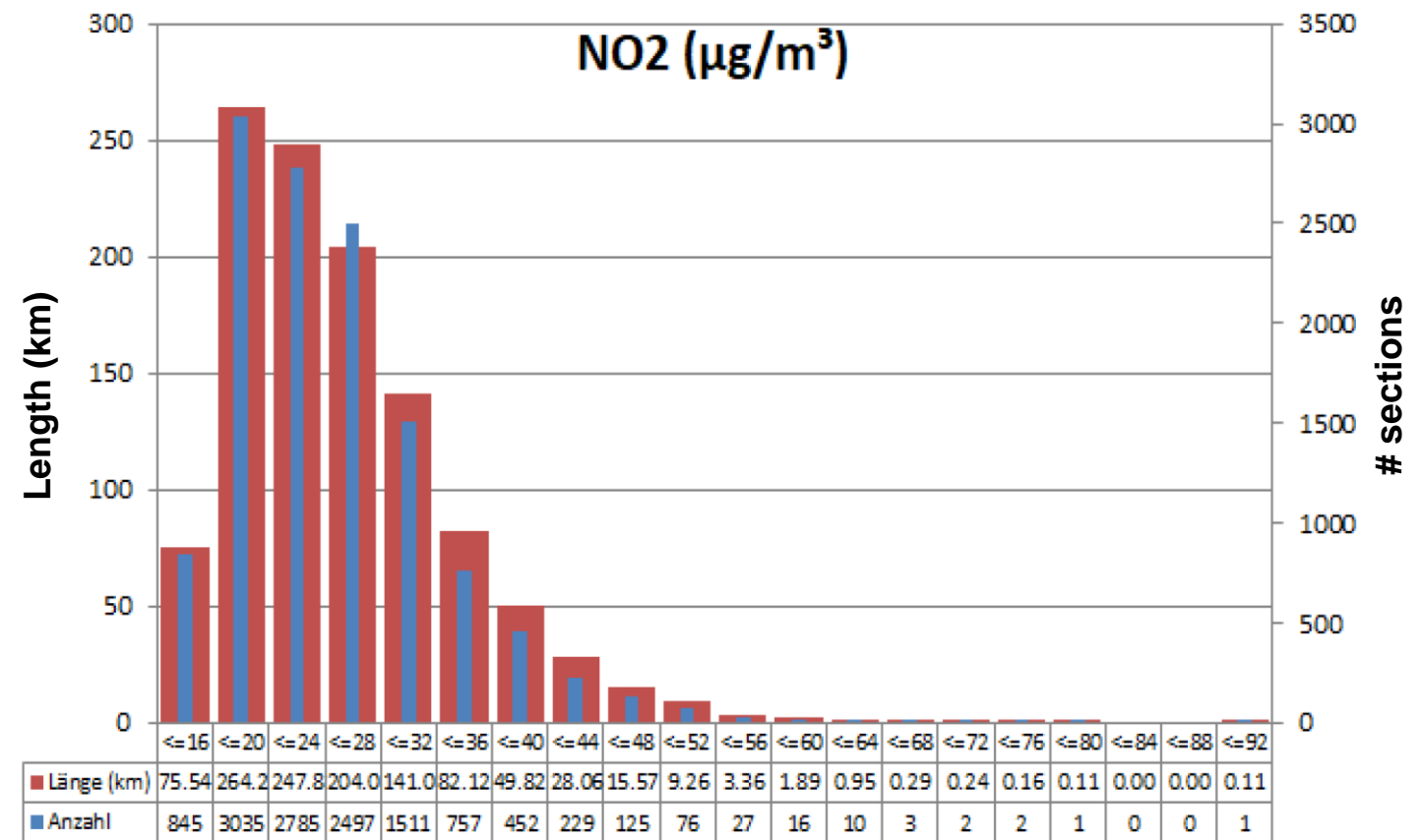
screening of > 12'000 sections, ≈ 1'125 km
NO_2: 10 - 90 µg/m³; red > 40 µg/m³

sections ≈ major road network

Example: Clean Air Plan Berlin 2018-2025

- 500m resolution is not fit-for-purpose for NO_2 in cities

- high-resolution micro-scale modelling is very "expensive" (and not necessary)

- section-based parametrized modelling ("screening")
  is a valid, proven and efficient approach
  $\Rightarrow$ concentrations along (built-up) roads

|	<=16	<=20	<=24	<=28	<=32	<=36	<=40	<=44	<=48	<=52	<=56	<=60	<=64	<=68	<=72	<=76	<=80	<=84	<=88	<=92
Länge (km)	75.54	264.2	247.8	204.0	141.0	82.12	49.82	28.06	15.57	9.26	3.36	1.89	0.95	0.29	0.24	0.16	0.11	0.00	0.00	0.11
Anzahl	845	3035	2785	2497	1511	757	452	229	125	76	27	16	10	3	2	2	1	0	0	1

Example: Clean Air Plan Berlin 2018-2025

- 500m resolution is not fit-for-purpose for NO_2 in cities

- high-resolution micro-scale modelling is very "expensive" (and not necessary)

- section-based parametrized modelling ("screening")
  is a valid, proven and efficient approach
  $\Rightarrow$ concentrations along (built-up) roads

- assignment to #persons to these segments is possible ($\Leftarrow$ e. g. strategic EU noise maps)
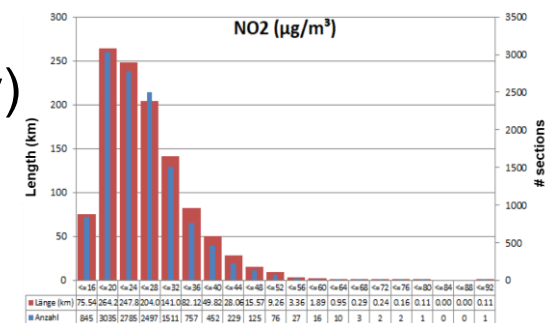
Berlin (major roads)			NO2 ≥ 40.5 µg/m³		
length	built-up length	persons	length	built-up length	persons
1'125 km	1'355 km	563'000	55.2 km	97.7 km	56'280

- this depends on the road-network, of course …
  … but so will any other model-based assessment
  … and it varies in a meaningful way

- it is not "very localized"

What is a sensible and efficient alternative if this approach is not to be used any more?

- side note: Methodology to combine road length based approach with the area approach
  Pfäfflin, F.; Diegmann, V.; Neunhäuserer, L. (HARMO 19 in Bruges, Belgium, 2019):
  Improving large-scale NO_2 exposure assessment by integrating air quality data for street canyons
  [https://www.harmo.org/Conferences/Proceedings/_Bruges/publishedSections/H19-050%20Florian%20Pfaefflin.pdf]

FAIRMODE CT 8: Exposure and exceedance indicators
–
Feedback on ESI

Thanks for your attention!

Florian Pfäfflin

IVU Umwelt GmbH, Freiburg, Germany

Fairmode technical meeting: Oslo 18-20/10/2022 (Online-Intervention)