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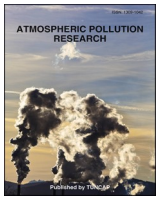

Corrigendum to 'Airborne monitoring of compliance to NOx emission regulations from ocean-going vessels in the Belgian North Sea' [Atmos. Pollut. Res. **13** (2022), 101518]

Ward Van Roy [a,*], Kobe Scheldeman [a], Benjamin Van Roozendael [a], Annelore Van Nieuwenhove [a], Ronny Schallier [a], Laurence Vigin [a], Frank Maes [b]

[a] Royal Belgian Institute of Natural Sciences, 1000, Brussels, Belgium
[b] Ghent University, Faculty of Law & Criminology, 9000, Ghent, Belgium

The authors wish to highlight that the use of the term "legal loopholes" in the final three paragraphs of the conclusions may unintentionally suggest a connotation of criminal behavior. Therefore, we prefer replacing it with the term "regulatory gaps" and rephrase the last three paragraphs—in section 4. Conclusions—accordingly to:

"Engine manufacturers design their Tier II engine to optimize fuel efficiency. As fuel efficiency conflicts with NOx emissions reduction, a trade-off needs to be made. The use of weighting factors per engine load creates an opportunity to reduce fuel consumption and still be on average compliant to the NOx emissions limits. Engine manufacturers are able to design engines in such way that NOx emissions in lower loads are higher than the higher loads, nevertheless the overall weighted average NOx emission approaches the limit for optimizing fuel consumption. For engine loads below 25%, no limits are even defined by MARPOL Annex VI Regulation 13. As a result, although consuming less fuel, Tier II OGVs may emit more NOx, which is especially the case for engine loads of 25 and 50% that occur in the maritime traffic in the Southern North Sea. An improvement of the NOx emission reduction impact of the standards could be achieved by defining NTE limits for Tier I and Tier II, applicable for the whole engine load spectrum like for Tier III.

The definition of emission limits according to the age of the OGV is the backbone of MARPOL Annex VI Regulation 13. Unfortunately, by applying the KLY instead of the year built in the regulations, a gap in the regulations is exploited, as many OGVs have been built since 2021, but yet have a KLY before 2021. Therefore, the effective favorable impact of Tier III standards in the field, and thus on the environment and public health, will be delayed by several years. This is demonstrated by the fact that only 13% of the OGVs with a length >70 m and a Gross Tonnage> 5000 GT with a built year in 2021 had a KLY in 2021. The use of this regulatory gap, resulted in an estimated 29000 premature deaths in 2021, these premature deaths could have been avoided if Tier III standards would have been applied for all OGVs built in 2021, a figure which is expected to rise substantially in the following years.

Last but not least, the ERS plays an import aspect in MARPOL Annex VI Regulation 13. For the vast majority of the observed OGVs, the ERS is lower than 130 rpm, which allows the use of (higher) linear values resulting in higher NOx emissions. Tier II OGVs have been found to be significantly more often rated at an ERS <130 rpm, which take advantage of the highest NOx emission limit. Nevertheless, for ROROs, passenger OGVs and OGVs <200 m, there is a higher probability for ERS above 130 rpm. The compilation of an additional ERS dataset could further improve the monitoring methodology and lower the number of false negatives."

Furthermore, it has come to our attention that an error was made in the description of the minimum power requirement for Tier 0 engines to meet Tier I standards. The unit "kWh" was used incorrectly instead of "kW." As a result, we would like to replace "5000 kWh" with "5000 kW" in Section 1.4.1, Section 3 and Section 6.1.

Lastly, we have noticed that the unit used for NOx in Formula 2 was incorrectly stated as "ppm" when it should be "ppb.". Therefore we wish to replace formula 2.

$$EF_{NO_x} = 3.33 \times \frac{\int \left[NO_x - NO_{x,bkg}\right]_{ppm} dt}{\int \left[CO_2 - CO_{2,bkg}\right]_{ppm} dt} \left[\frac{g}{kg\ fuel}\right]$$

With

$$EF_{NO_x} = 3.33 \times \frac{\int \left[NO_x - NO_{x,bkg}\right]_{ppb} dt}{\int \left[CO_2 - CO_{2,bkg}\right]_{ppm} dt} \left[\frac{g}{kg\ fuel}\right] \quad (2)$$

The authors would like to apologize for any inconvenience caused.

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* Corresponding author.
E-mail address: wvanroy@naturalsciences.be (W. Van Roy).

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