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Discussions

Interactive comment on "Time-resolved emission reductions for atmospheric chemistry modelling in Europe during the COVID-19 lockdowns" *by* Marc Guevara et al.

Anonymous Referee #1

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The lockdowns instituted by many governments around the world in response to the COVID-19 pandemic have had significant effects on emissions of air pollutants and resulting ambient air quality. This topic has already received a lot of attention in the scientific literature within a relatively short period of time. The manuscript by Guevara et al. provides a timely contribution to the quantification of the emission changes due to lockdown measures implemented in Europe. Traditionally, the compilation of emission inventories is a long, slow process, with reliable emission data usually becoming available after several years. Given the strong interest from modelling groups in simulating the effects of these lockdowns on air quality, there is clearly a need for a fast-track estimate of COVID-19-related changes in emissions for use in modelling studies.

Guevara et al. compile a set of national, sectoral emission reduction factors for European countries based on various datasets which are available now. The methodology used to derive the reduction factors is clearly described, the contingent nature of the resulting reduction factors is acknowledged and clearly described, and the reduction factors themselves are provided for the community. This aspect alone makes the paper a valuable contribution to the literature.

Guevara et al. also apply these emission reduction factors in a model simulation and compare the reductions in modelled NO2 with observed reductions in selected European cities during the lockdowns. The analysis of the model simulations is relatively superficial, but the value of the paper is clearly in the transparent calculation of the reduction factors and the provision of these factors to the community.

I only have one minor comment. The authors should indicate the year on which the CAMS-REG-AP emission inventory used in the modelling component of the study is based.