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Comment on acp-2021-854

Anonymous Referee #2

Referee comment on "Opinion: Insights into updating Ambient Air Quality Directive 2008/50/EC" by Joel Kuula et al., Atmos. Chem. Phys. Discuss.,
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This article is a short opinion paper in which the authors propose three specific topics (use of sensors for regulatory monitoring, siting criteria and new air pollutants to monitor) that should be considered for the current revision of the European Air Quality directive. This article provides in my view a valuable input to this review process. It is well written and is also of interest to readers who are not directly involved in the review of the Air Quality Directive and even to readers who are not familiar with this legal framework document. This paper should therefore be published in ACP.

I have few comments that should be taken into account:

1. Page 2, last section: I don't really understand what the authors mean with the sentence. "Currently, the devices used for measurement-based online observation are almost limited to fixed measurement types." What are measurement-based online observations, and are the authors advocating for mobile measurements? Please check if this is clear or rephrase. Then the authors state that type approval is mandatory for regulatory measurements. I think this is not correct (but maybe I'm wrong): Regulatory measurements must be done according to the reference method as defined in EN standards, and the easiest way to do this is by using an instrument that is type approved according to the corresponding EN standard. However, any other method can be used which give results that are equivalent to the reference method. Of course, equivalence needs to be demonstrated (see the Air Quality Directive). I therefore also don't think that the conclusion is correct that there is no "incentive for a company ... (page 3, first line)".

2. The authors suggest that low-cost sensors can/should play a role in the hierarchical network of regulatory observations and they somehow imply that sensors are capable for providing indicative measurements (Figure 1). I think, however, that this is what we currently expect or maybe hope, but to my knowledge the current literature does not show that sensors are in real-world applications and over longer time periods capable of providing data of higher quality than modelling or objective estimation. Anyhow, it is clear

that a good data quality with sensors will not come for free, appropriate strategies for quality assurance and control must be implemented that will lead to significant operational costs. Maybe the authors want to mention this.

3. In the summary and conclusions section it is stated that "technological development of air quality sensors is advancing rapidly". True, there is significant technological development in PM sensors, or the miniaturization of optical particle counting technologies. However, for gas sensing the applied technologies in air quality sensors (e.g. electrochemical cells and metal-oxide sensors) are not new and improvements are rather slow. Maybe we are misled by the fast technological developments in sensor integration, data communication, storage and visualization etc. Given the improving air quality in Europe (e.g. NO₂), technological developments of sensors are needed so that they can play a role in regulatory air quality monitoring. If the authors agree, they could add a sentence.

4. Page 3, 2nd paragraph. I don't the first sentence "Although the testing protocol ...", is linguistically correct, please check.

5. Page 4, line106, typo, should be "zones".