

## ***Interactive comment on “A very high-resolution assessment and modelling of urban air quality” by Tobias Wolf et al.***

### **Anonymous Referee #2**

Received and published: 28 October 2019

General comments: The manuscript “” written by Tobias Wolf describes the result from very high-resolution large eddy simulations of air pollutant dispersion in Bergen, Norway. The manuscript contains novel investigation to demonstrate the importance of resolving local circulations on detailed air quality assessment, especially in the inlet of the sea between steep slopes (i.e., fjord). The topic of the manuscript is certainly within the scope of ACP. Overall, the manuscript is well written and easy to follow. I would like to consider the publication of the manuscript from ACP, while I have several comments below which should be addressed before publication.

Specific comments:

Abstract Could you make novel findings more explicit?

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3.1 The PALM Model The assumption that loss processes are omitted in the simulations seems to be plausible under the condition used in this study. But it is better to quantitatively show that typical time scales of these loss processes are sufficiently longer than typical transport time scale to justify the assumption for readers.

Is dry deposition process not considered?

4.1. Baseline scenario simulations p. 10, l. 10-11: “This was also confirmed with a detailed analysis of local pollutant measurements at the two reference” p. 10, l. 23-24: “This was visible in the PALM simulations as well as in the detailed analysis of the available air pollution observations at the tow reference stations.” How did you confirm the dominant sources of NO<sub>2</sub> and PM<sub>2.5</sub> using measurement data and the consistency with the PALM simulation? Could you explain them briefly in the text or cite the references?

p. 10, l. 20-21: “Some urban areas might be affected by pollution transport over several kilometers and accumulation of emitted substances strongly different from the emission pattern.” It is difficult to see the differences between concentration and emission patterns from Figures 1 and 5. Could you make emission flux maps used in the PALM simulations?

4.3. Air pollution pattern sensitivity to meteorological scenarios You show results from only three scenarios. How do you choose the three scenarios? You find no significant difference between the baseline simulation and other scenario simulations. Or These scenarios can be representative for all scenarios.

Technical correction:

p. 3, l. 28: please correct “air.pollution”

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