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Overview: Recent advances on the understanding of the Northern Eurasian environments and of the urban air quality in China – Pan-Eurasian Experiment (PEEX) program perspective

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Pan-Eurasian Experiment (PEEX) Programme (www.atm.helsinki.fi/peex) is an asset for PEEX to have high international visibility, to attract further research collaboration and to upscale its scientific impact in various arenas. The PEEX research focus is on the northern high latitudes environments and on the transport and transformation of air pollution in China (Kulmala et al. 2015, Lappalainen et al. 2014; 2015; 2016; 2018, Vihma et al. 2019, Alekseychik et al. 2019, Kasimov et al. 2018). In 2019 PEEX started comprehensive analysis on the first results over last five years attained from the PEEX geographical domain. The aim of the analysis is to study the state-of-the-art research outcome versus the PEEX large-scale research questions addressed by the Science Plan (Lappalainen et al. 2015). Lappalainen et al. 2021 (submitted) introduces recent observations and results from the Russian Arctic, Northern Eurasian boreal forests (Siberia) and peatlands and on the mega cities in China. We frame our analysis against research themes introduced in the the PEEX Science Plan (2015). Although the scientific knowledge in these regions has increased, there are still gaps in our understanding of large-scale climate-Earth surface interactions and feedbacks. This arises from limitations in research infrastructures and integrative data analyses, hindering a comprehensive system analysis. The fast-changing environment and ecosystem changes driven by climate change, socio-economic activities like the China Silk Road Initiative, and the global trends

like urbanization further complicate such analyses. We recognize new topics with an increasing importance in the near future, such as enhancing biological sequestration capacity of greenhouse gases into forests and soils to mitigate the climate change and the socio-economic development to tackle air quality issues.