



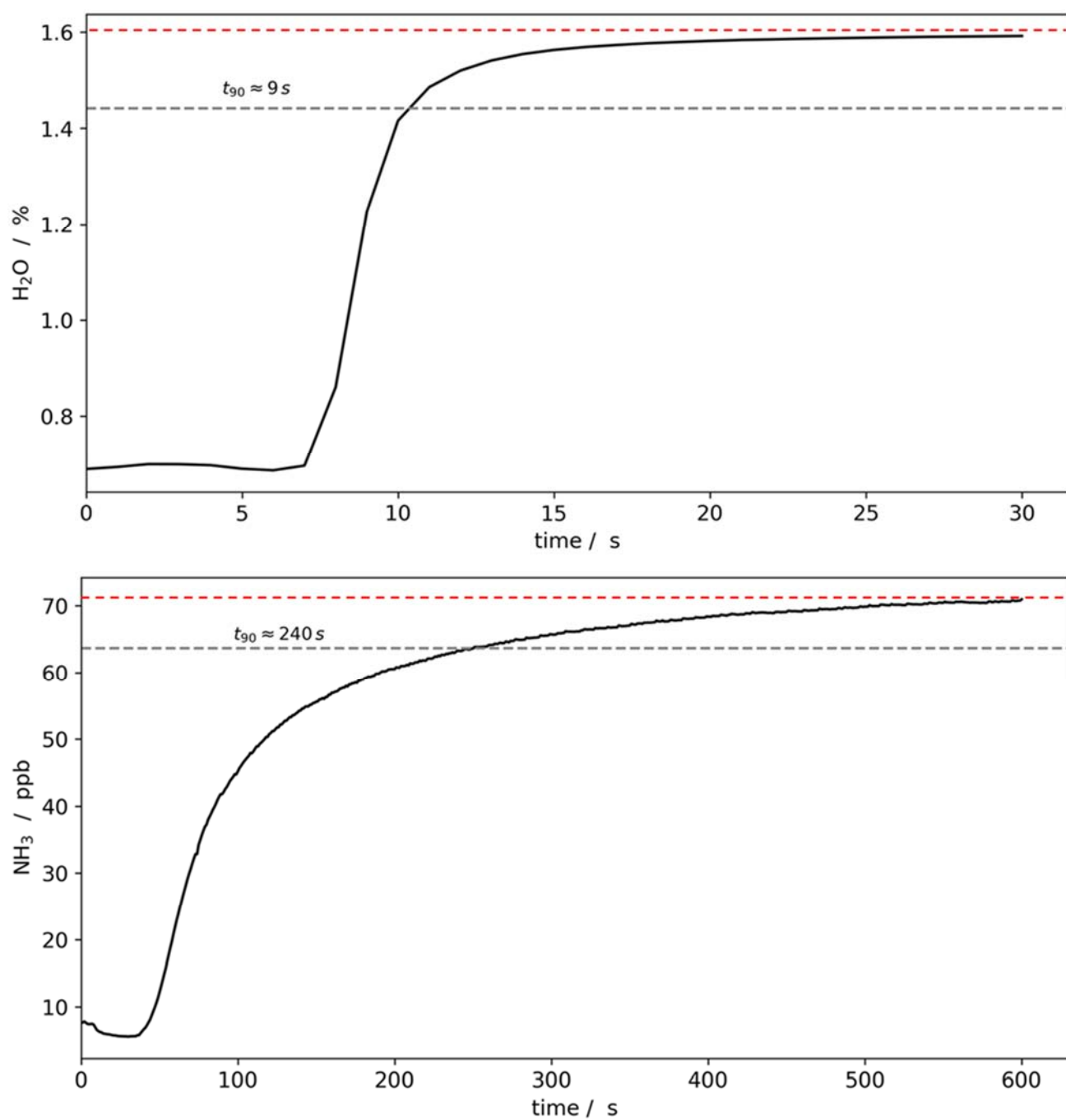
*Supplement of*

**Air quality observations onboard commercial and targeted Zeppelin flights in Germany – a platform for high-resolution trace-gas and aerosol measurements within the planetary boundary layer**

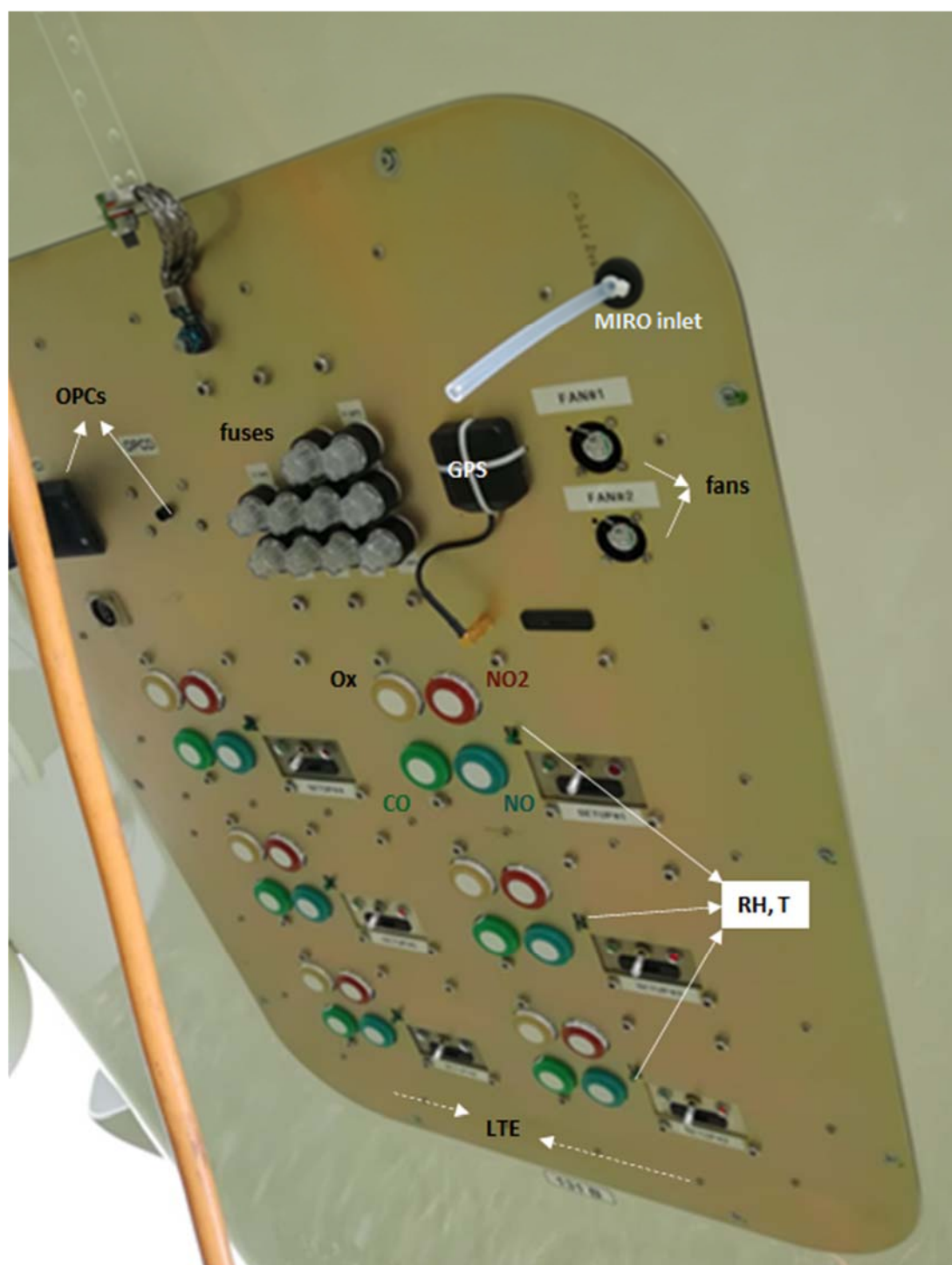
**Ralf Tillmann et al.**

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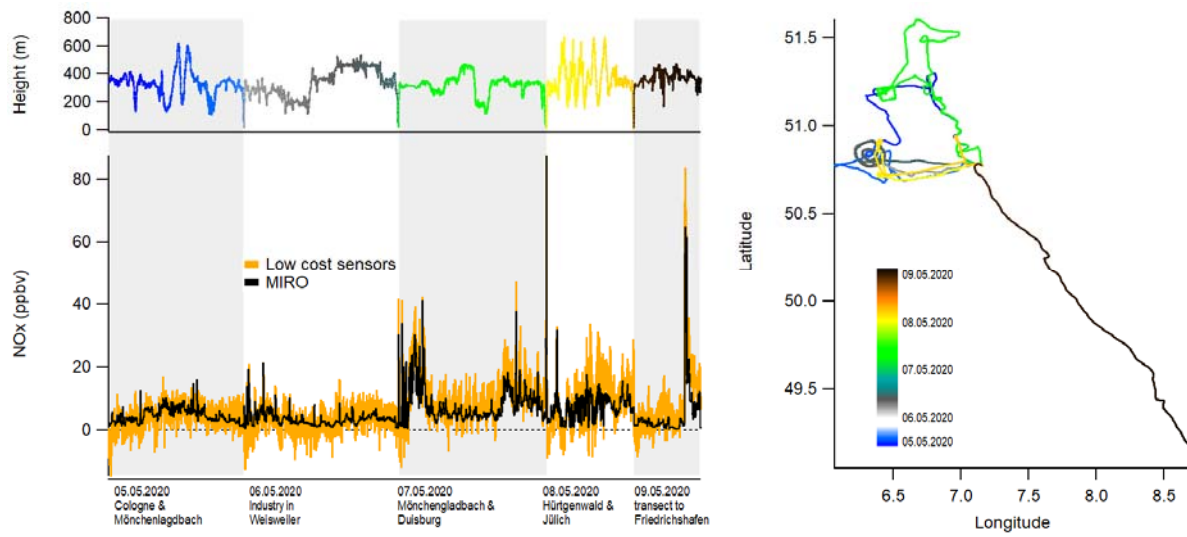
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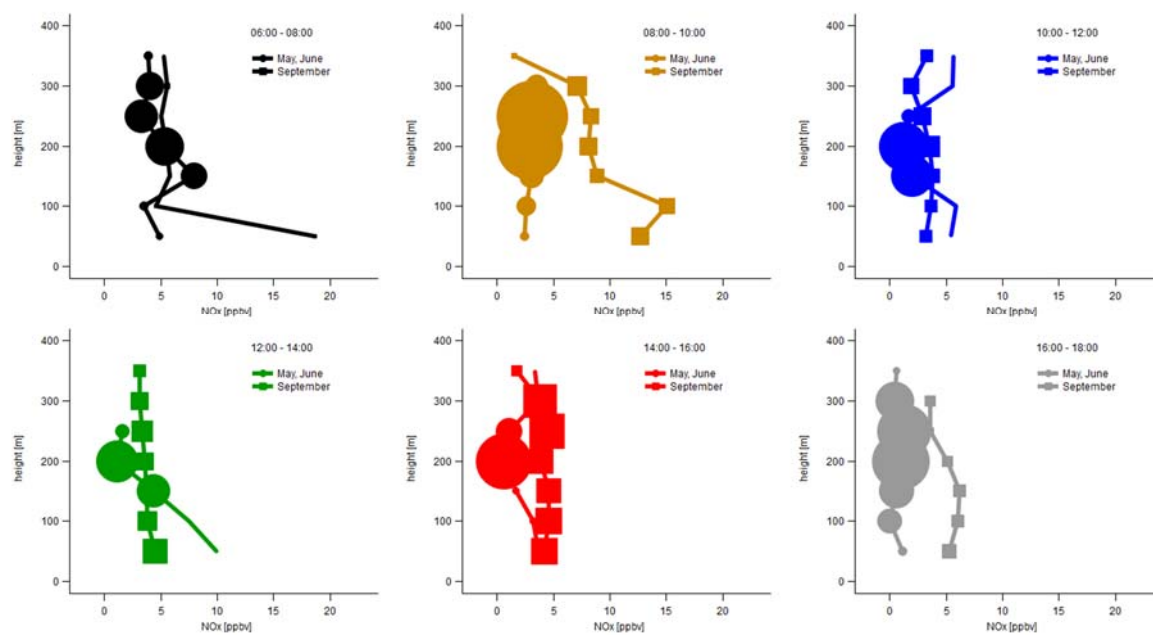
**Figure S1:** MIRO response times for H<sub>2</sub>O and NH<sub>3</sub>. The red horizontal line indicates the set value.



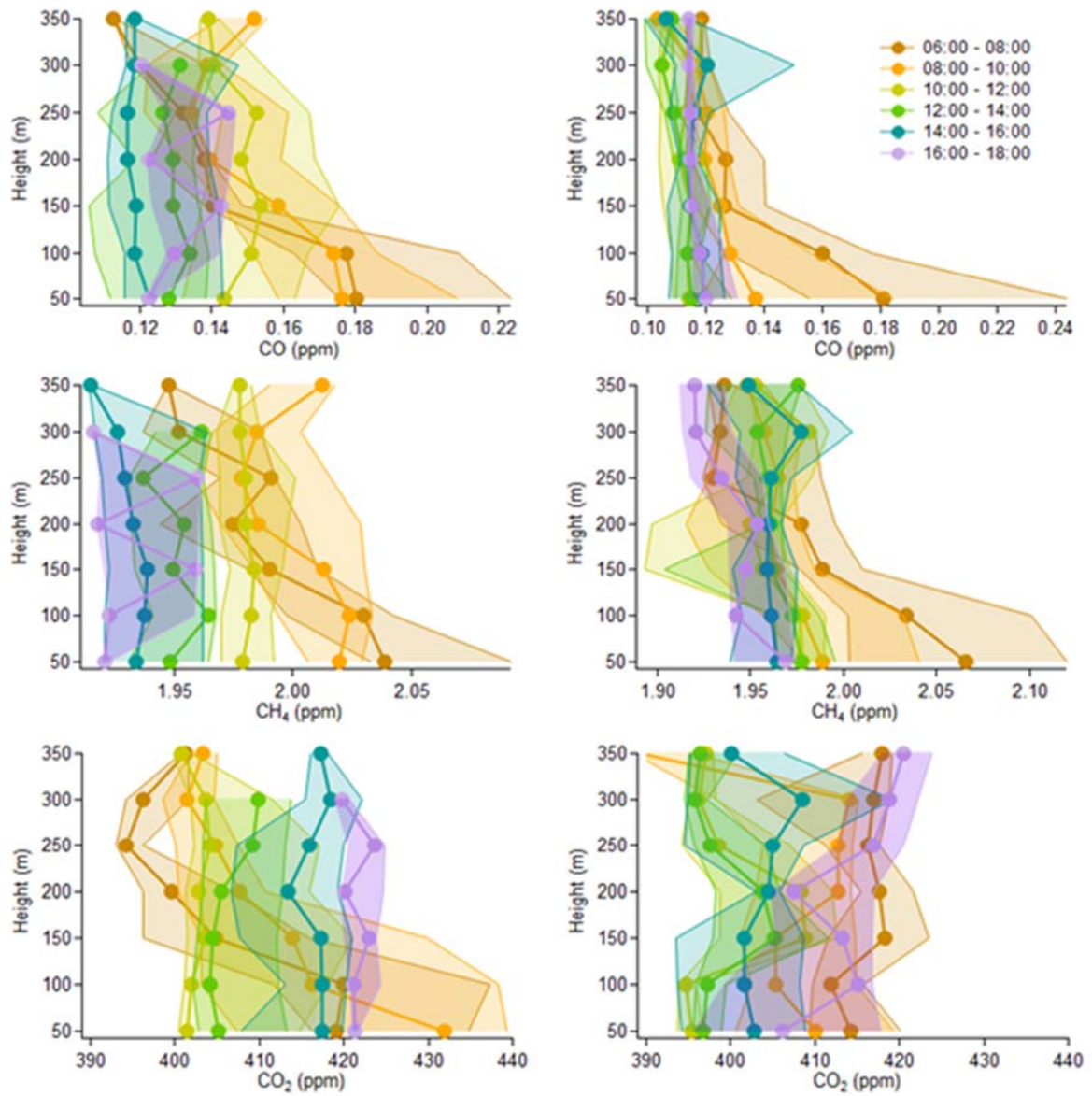
**Figure S2:** Hatch box setup. Only the location of the LTE antennas is included in this picture with dashed lines.



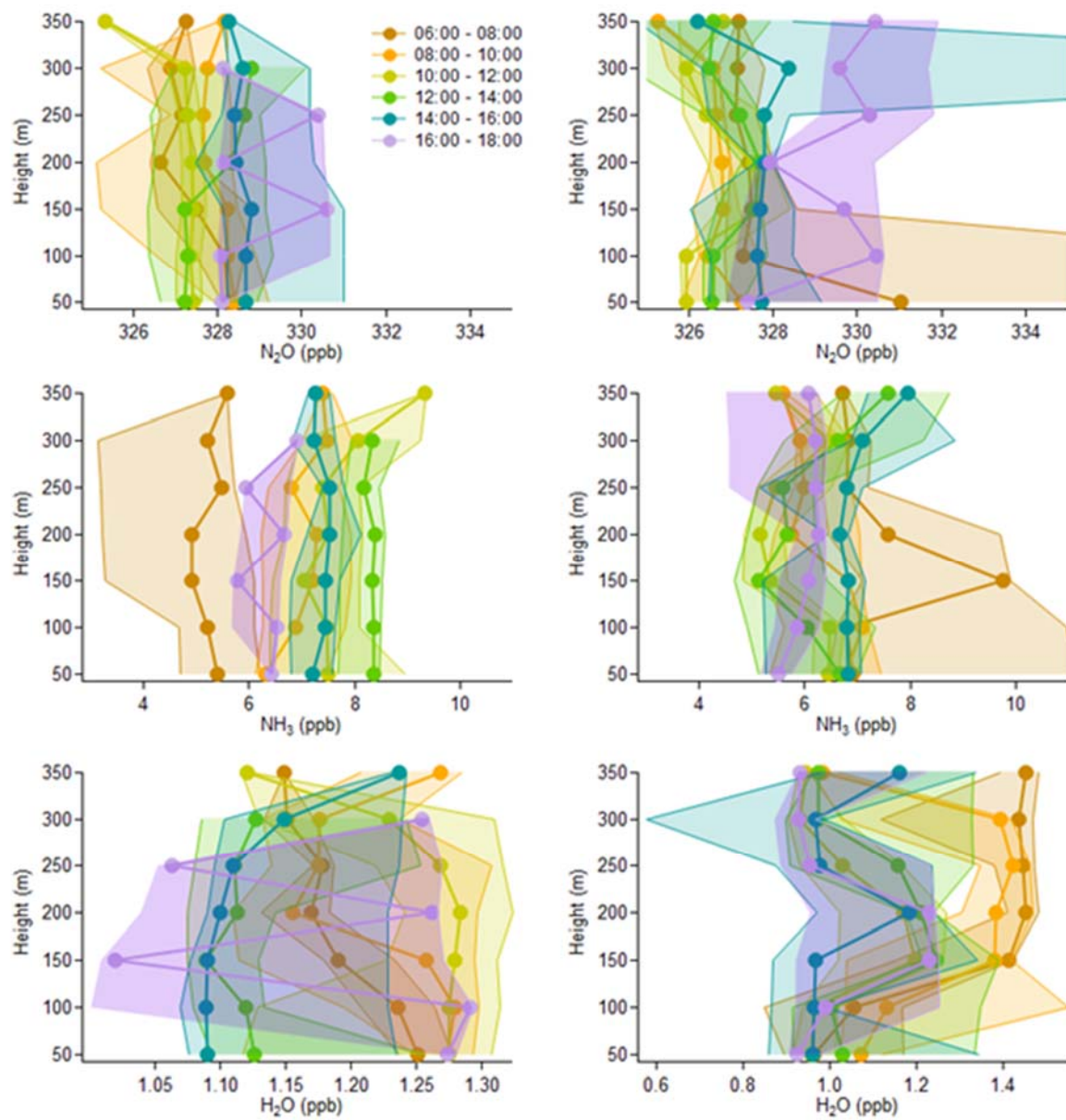
**Figure S3:** Timeseries of  $\text{NO}_x$  mixing ratios for the low-cost sensors and the MIRO as well as the height of the Zeppelin measurements for 5 flight days. On the right, the location of these measurements is also provided.



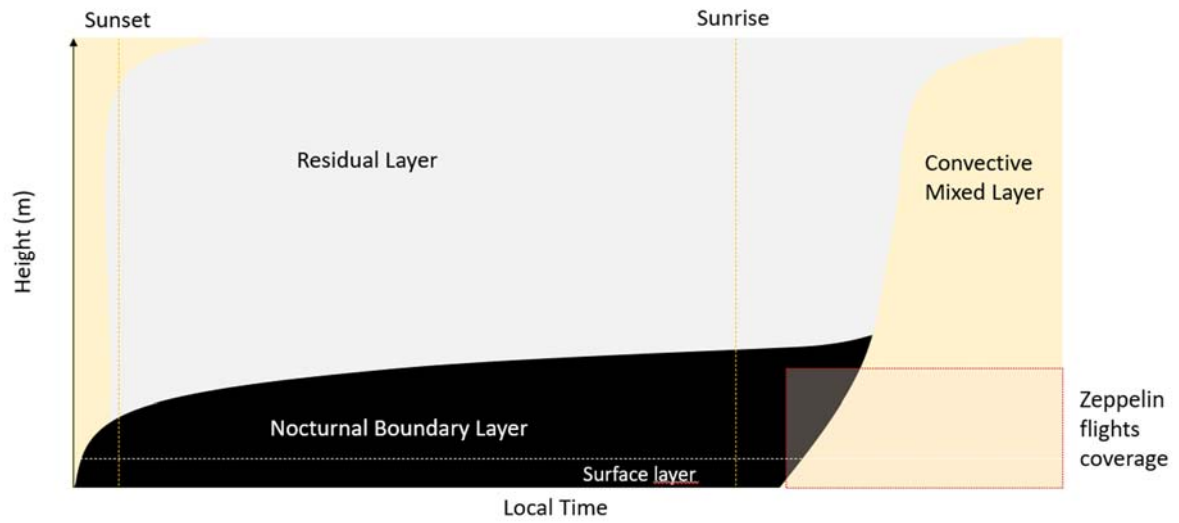
**Figure S4:** Vertical distribution of pollutants in Bonn during different seasons. Size indicates the number of data points included in each marker.



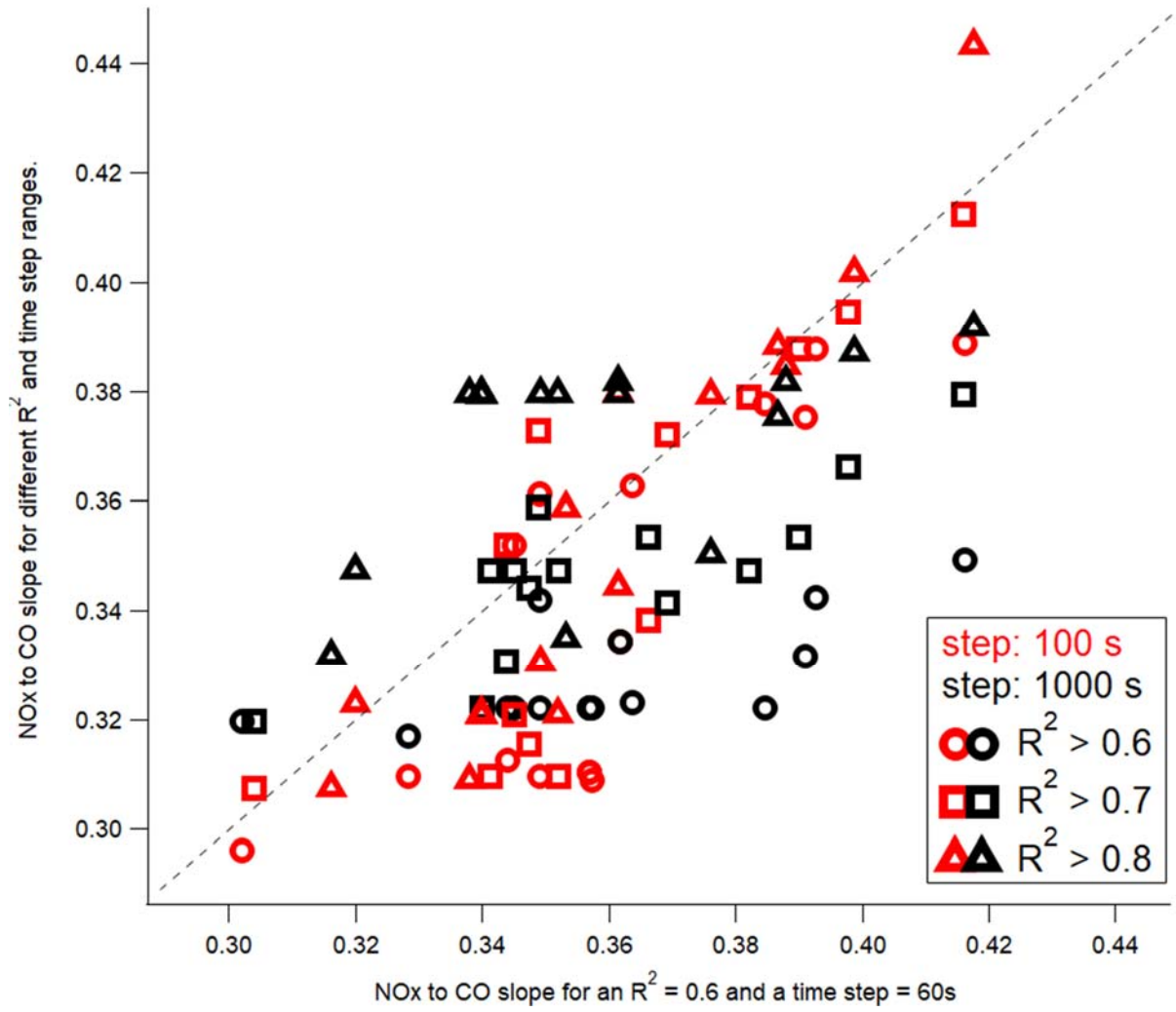
**Figure S5:** Vertical distribution of pollutants in Frankfurt (left) and Bonn (right) at different time intervals.



**Figure S6:** Vertical distribution of pollutants in Frankfurt (left) and Bonn (right) at different time intervals.



**Figure S7:** Qualitative representation of the planetary boundary layer dynamics during the Zeppelin flights (Stull 1988).



**Figure S8:** Sensitivity analysis for the  $\text{NO}_x$  to CO slope calculations during the Zeppelin flights based on the goodness of the fit indicated by the  $R^2$  and the time step chosen to fit the  $\text{NO}_x$  and CO data.

**Table S1:** Ground-based monitoring stations. Details on the data retrieval can be found here:  
<https://www.umweltbundesamt.de/daten/luft/luftdaten/stationen> (last visited: 2021/10/14).

EEA code	Latitude [°N]	Longitude [°E]	Station Names	Station Type	Station Area
DEHE005	50.1017	8.54252	Frankfurt-Höchst	background	urban
DEHE150	50.1133	8.59426	Frankfurt-Niedwald	background	urban
DEHE008	50.12533	8.74634	Frankfurt-Ost	background	urban
DEHE135	50.0755	8.57631	Frankfurt-Schwanheim	background	urban
DEHE011	50.1358	8.92157	Hanau	background	urban
DEHE018	50.0103	8.4515	Raunheim	background	urban
DEHE022	50.0503	8.24495	Wiesbaden-Süd	background	urban
DEHE041	50.1246	8.69191	Frankfurt-Friedb. Landstr.	traffic	urban
DEHE116	50.1014	8.78489	Offenbach-Untere Grenzstr.	traffic	urban
DEHE037	50.0772	8.23032	Wiesbaden-Ringkirche	traffic	urban
DEHE112	50.0721	8.22887	Wiesbaden-Schiersteiner Str.	traffic	urban
DEHE052	50.2219	8.44608	Kleiner Feldberg	background	rural