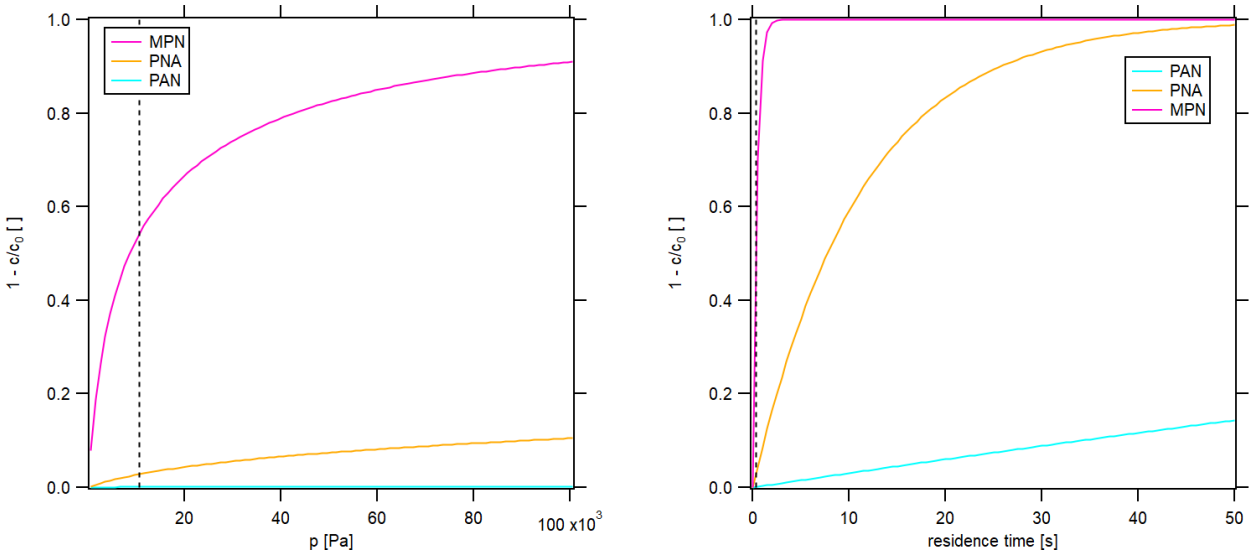
Supplementary Information: New converter for improving aircraft measurements of NO_2 via photolytic chemiluminescence.

Clara M. Nussbaumer[1], Uwe Parchatka[1], Ivan Tadic[1], Birger Bohn[2], Daniel Marno[1], Monica Martinez[1], Roland Rohloff[1], Hartwig Harder[1], Flora Kluge[3], Klaus Pfeilsticker[3], Florian Obersteiner[4], Martin Zöger[5], Raphael Doerich[1], John N. Crowley[1], Jos Lelieveld[1,6], and Horst Fischer[1]

[1]Max Planck Institute for Chemistry, Department of Atmospheric Chemistry, 55128 Mainz, Germany
[2]Institute of Energy and Climate Research, IEK-8: Troposphere, Forschungszentrum Jülich GmbH, 52428 Jülich, Germany
[3]Institute of Environmental Physics, Heidelberg Univsersity, 69120 Heidelberg, Germany
[4]Karlsruhe Institute of Technology, 76021 Karlsruhe, Germany
[5]Flight Experiments, German Aerospace Center (DLR), 82234 Oberpfaffenhofen, Germany
[6]Climate and Atmosphere Research Center, The Cyprus Institute, Nicosia, Cyprus

Correspondence: Clara M. Nussbaumer (clara.nussbaumer@mpic.de)



(a) pressure dependent decay

(b) time dependent decay

Figure S1. Decay of NO_2 reservoir species in correlation with (a) the pressure and (b) the residence time in the converter.

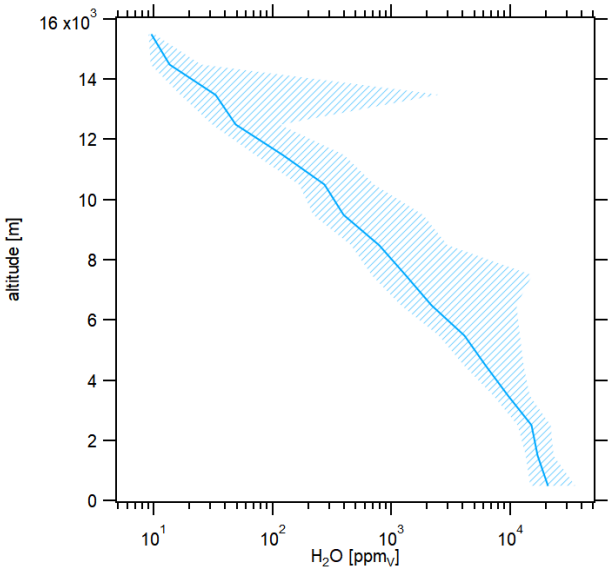
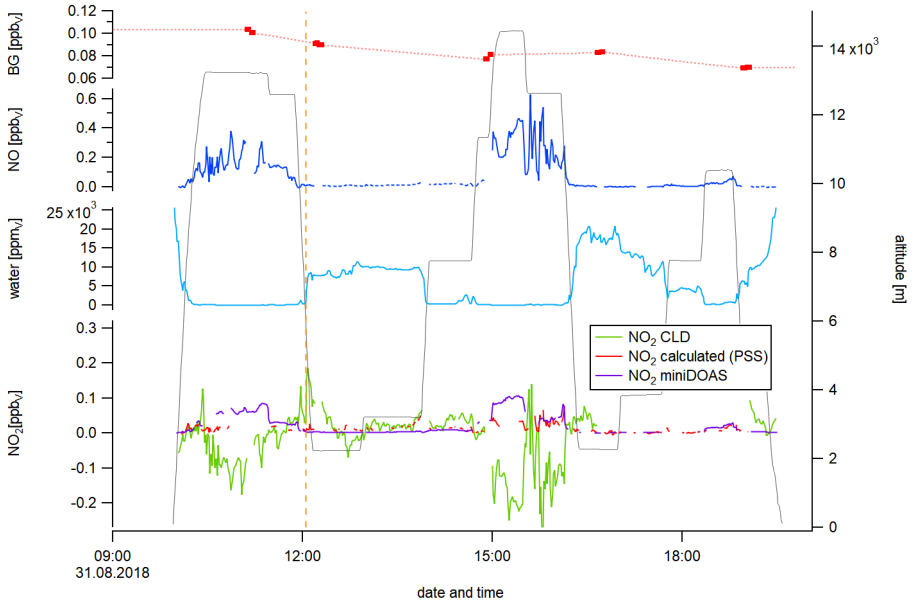
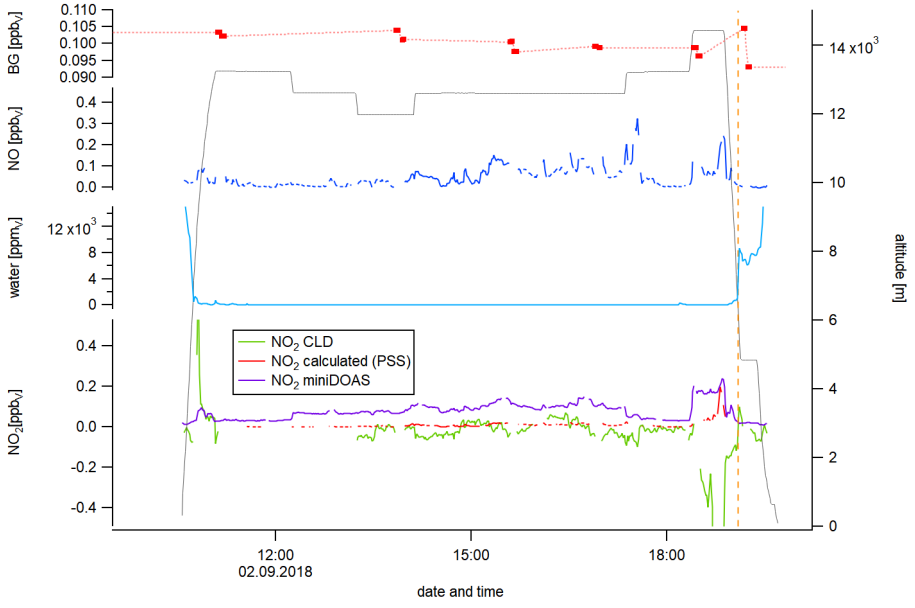


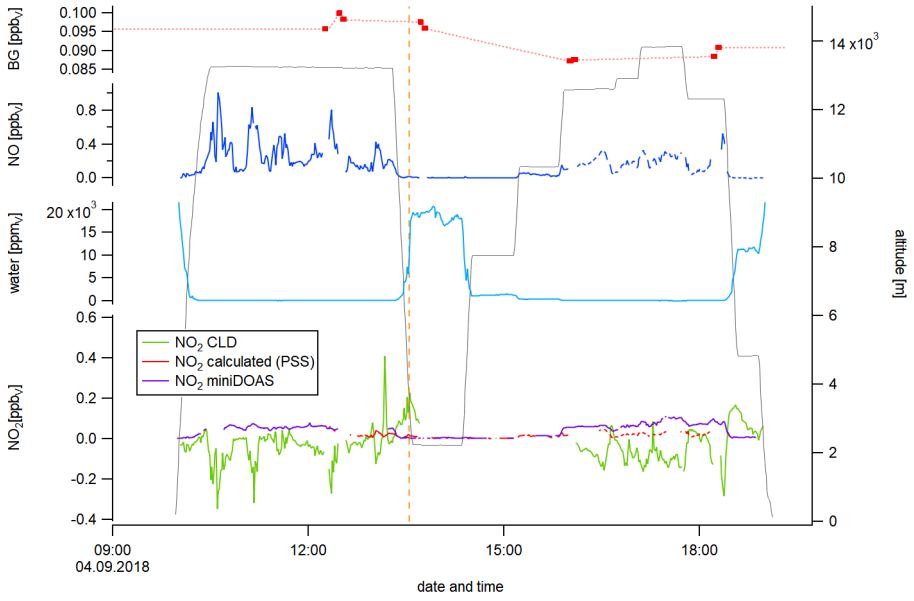
Figure S2. Vertical profile of atmospheric water vapor concentrations.


BG [ppb$_v$]
NO [ppb$_v$]
water [ppm$_v$]
NO$_2$[ppb$_v$]
altitude [m]
NO$_2$ CLD
NO$_2$ calculated (PSS)
NO$_2$ miniDOAS
09:00
31.08.2018
12:00
15:00
18:00
date and time

(a) MF13

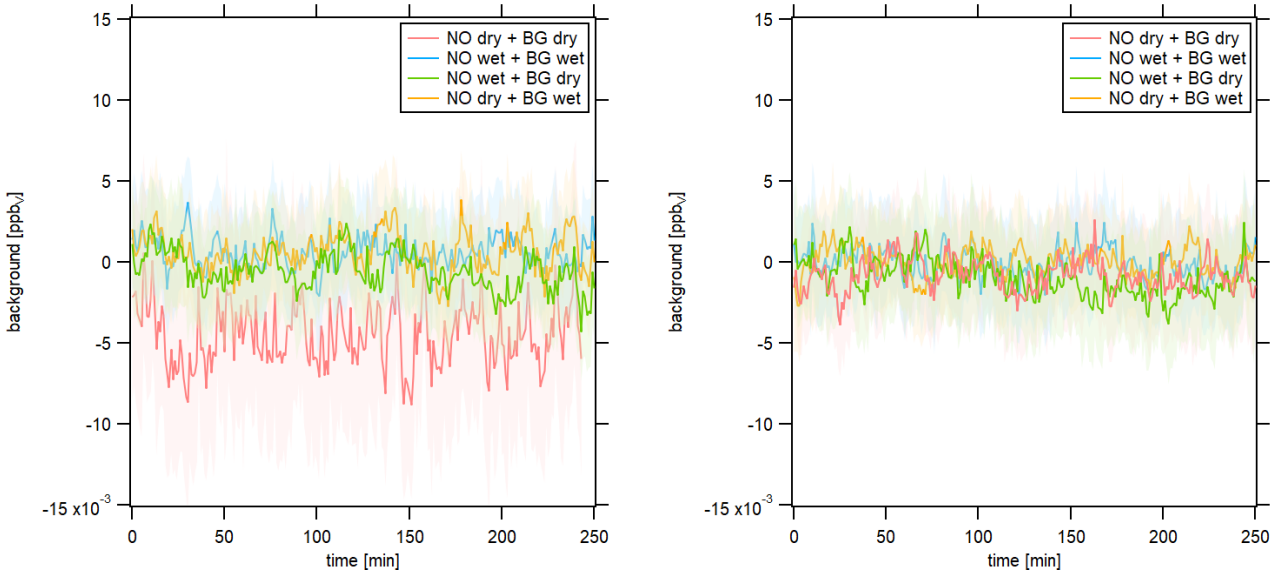

BG [ppb$_v$]
NO [ppb$_v$]
water [ppm$_v$]
NO$_2$[ppb$_v$]
altitude [m]
NO$_2$ CLD
NO$_2$ calculated (PSS)
NO$_2$ miniDOAS
12:00
02.09.2018
15:00
18:00
date and time

(b) MF14



(c) MF15

Figure S3. Temporal development of NO, water vapor, and calculated and measured NO_2 exemplarily for measurement flights 13, 14 and 15.



(a) old converter

(b) new converter

Figure S4. Instrumental background of the first channel in response to dry and humid conditions after 2 h of NO calibration at 16 ppbv in analogy to Figure 6 of the manuscript.

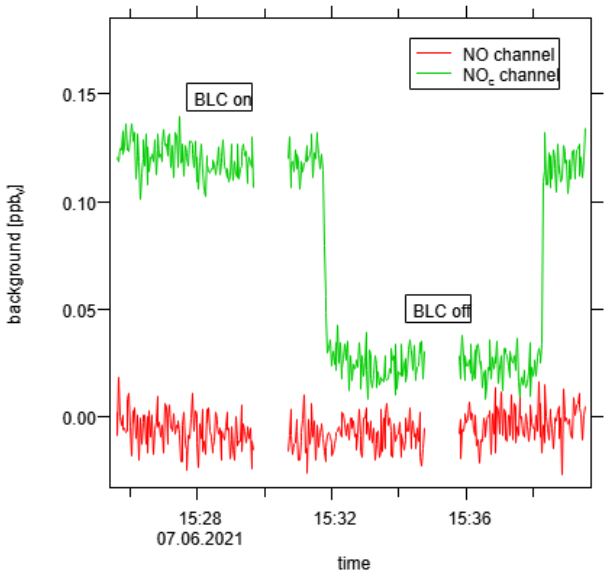
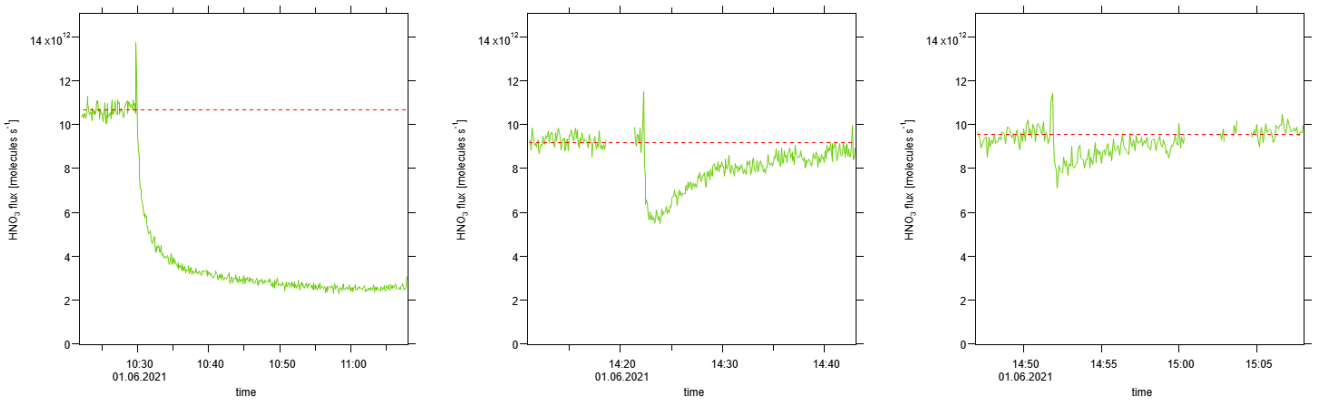


Figure S5. Instrumental background when switching the LEDs in the conventional blue light converter on and off during zero air measurement.



(a) old converter (b) new converter (c) new converter with FEP coating

Figure S6. HNO_3 uptake experiment.