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The IAGOS NO_x instrument – design, operation and first results from deployment aboard passenger aircraft

Florian Berkes et al.

Correspondence to: Florian Berkes (f.berkes@fz-juelich.de) and Andreas Petzold (a.petzold@fz-juelich.de)

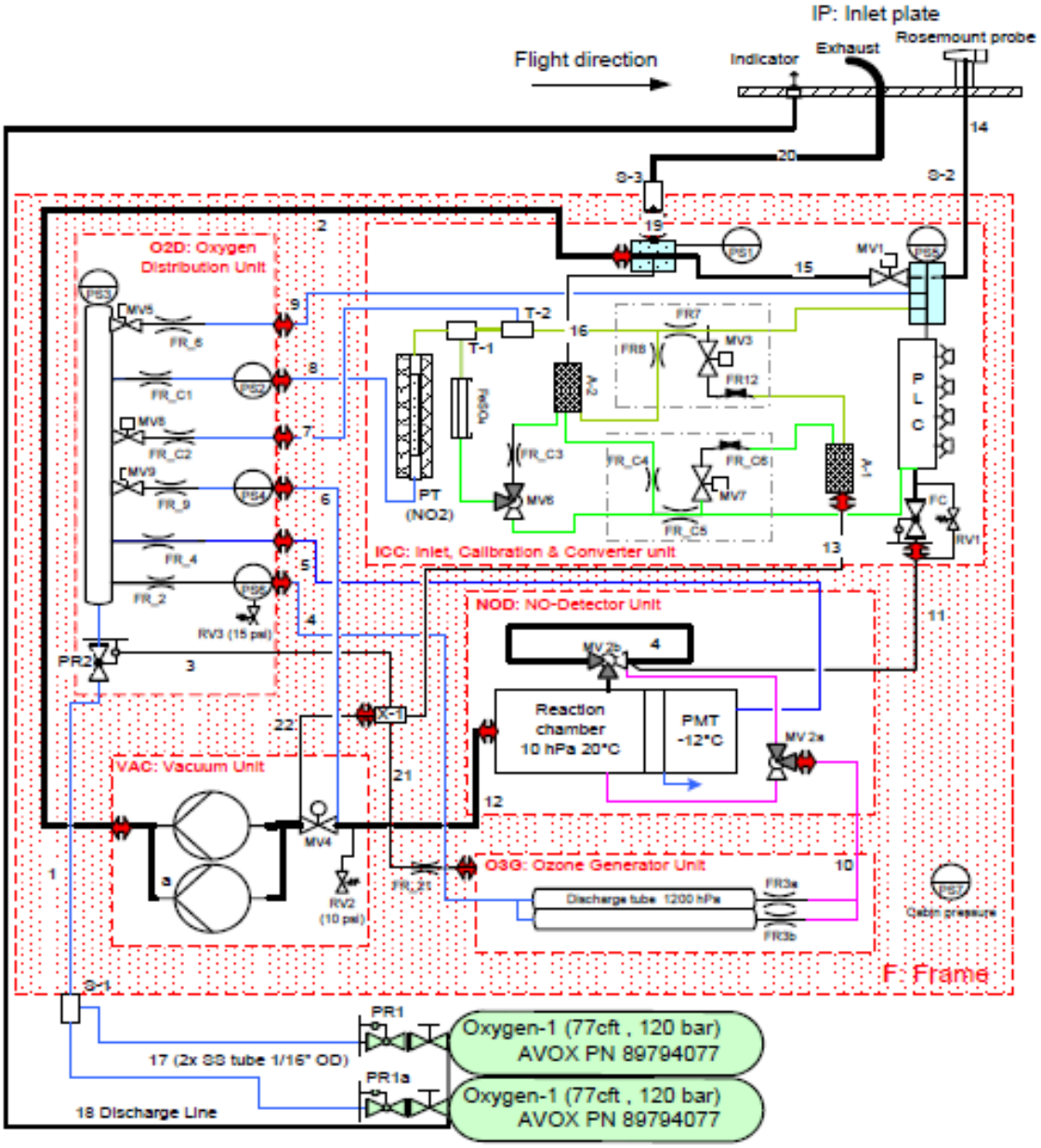
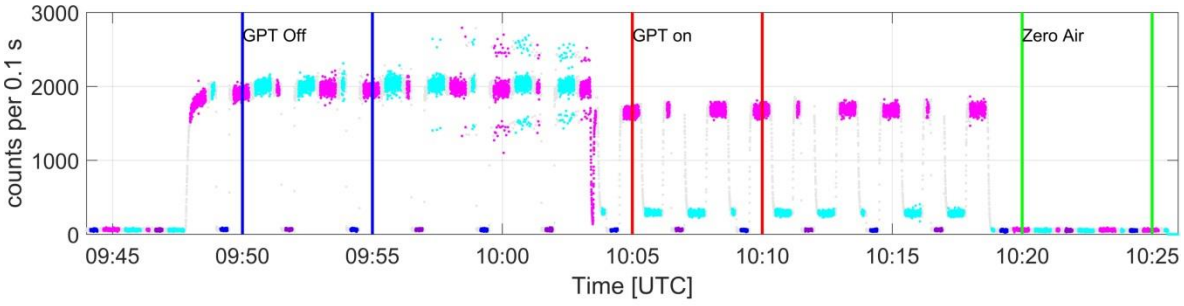


Figure S1: Detailed pneumatic diagram of the IAGOS NO_x instrument (Revision 1), showing all pneumatic connections. A details description is available in the SOP (https://www.iagos.org/iagos-core-instruments/package2b/).



Date:20160928_092431
File name:B201_20160928_092431
External data:
NO Referenz:15.5 ppbv

S_{NOD}:1.2516 cps/pptv
E_{PLC}:83.5%
Titration:87.7 %

	Netto	MessMode	ZeroMode
NO: Offset (ZeroAir)	0	500	500
NO: GPT off	19400	20030	630
NO: GPT on	2385	2910	525
NOc: Offset (ZeroAir)	40	560	520
NOc: GPT off	18860	19500	640
NOc: GPT on	16155	16765	610

Figure S2: Determination of instrument characteristics during an external GPT in the laboratory. GPT off: only NO is flushed through the instrument. GPT on: mixture of NO and NO_2. Zero-Air: NO and NO_2 free gas. For each interval at least 5 minutes of measurements are taken. Measure modes are shown for NO_c (pink) and for NO (light blue); the zero modes are shown for NO_c (purble) and for NO (dark blue).

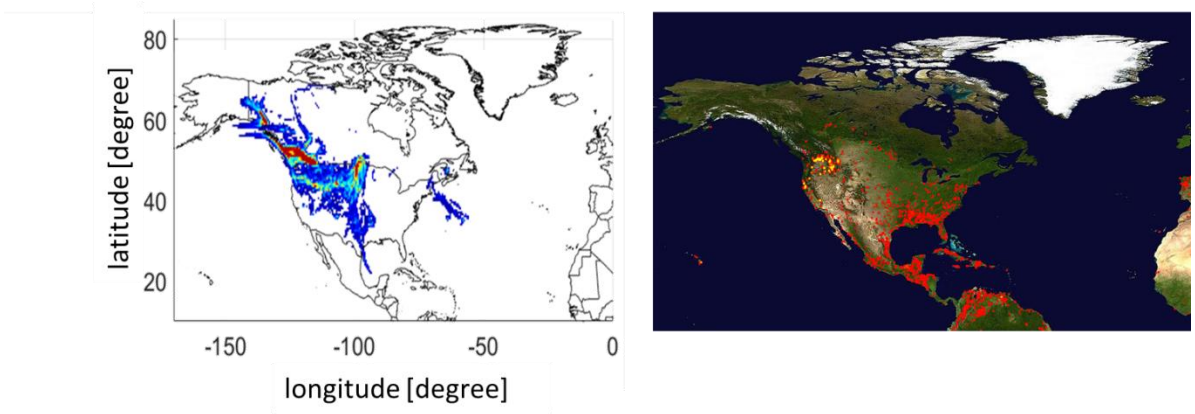


Figure S3: Left: Possible contribution of surface air masses based on 4 days backward simulations using the FLEXPART model on the Plume observed at cruise altitude shown in Fig 12. FLEXPART was driven by meteorological analysis data of 1° degrees in longitude and latitude with 60 hybrid-pressure levels in the vertical from ERA-Interim. Tracers are inert, non-interacting particles and released for one hour when the first plume was observed (23 UTC). FLEXPART model output is given as the potential emission sensitivity (PES) of the particles over a particular region every hour. For this analysis the PES was time-intergraded over the analyzed period from the surface up to 500 m. Right: Fire detection map at this time period from https://lance.modaps.eosdis.nasa.gov/cgi-bin/imagery/firemaps.cgi.

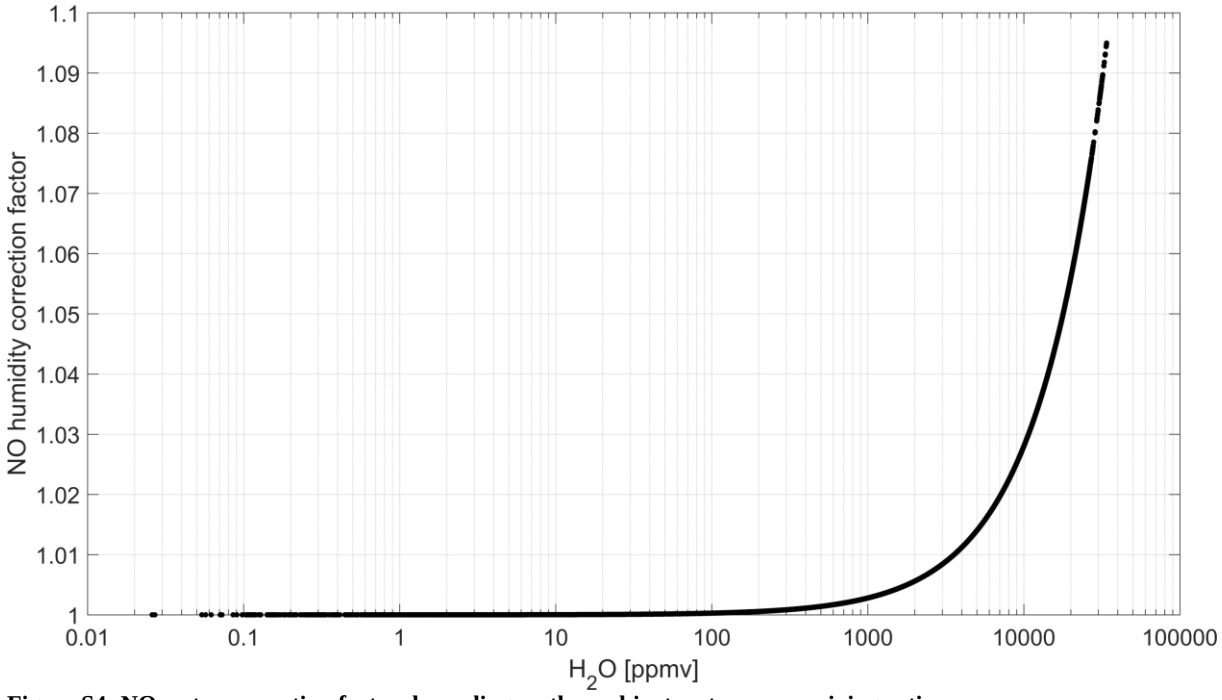


Figure S4: NO water correction factor depending on the ambient water vapor mixing ratio.

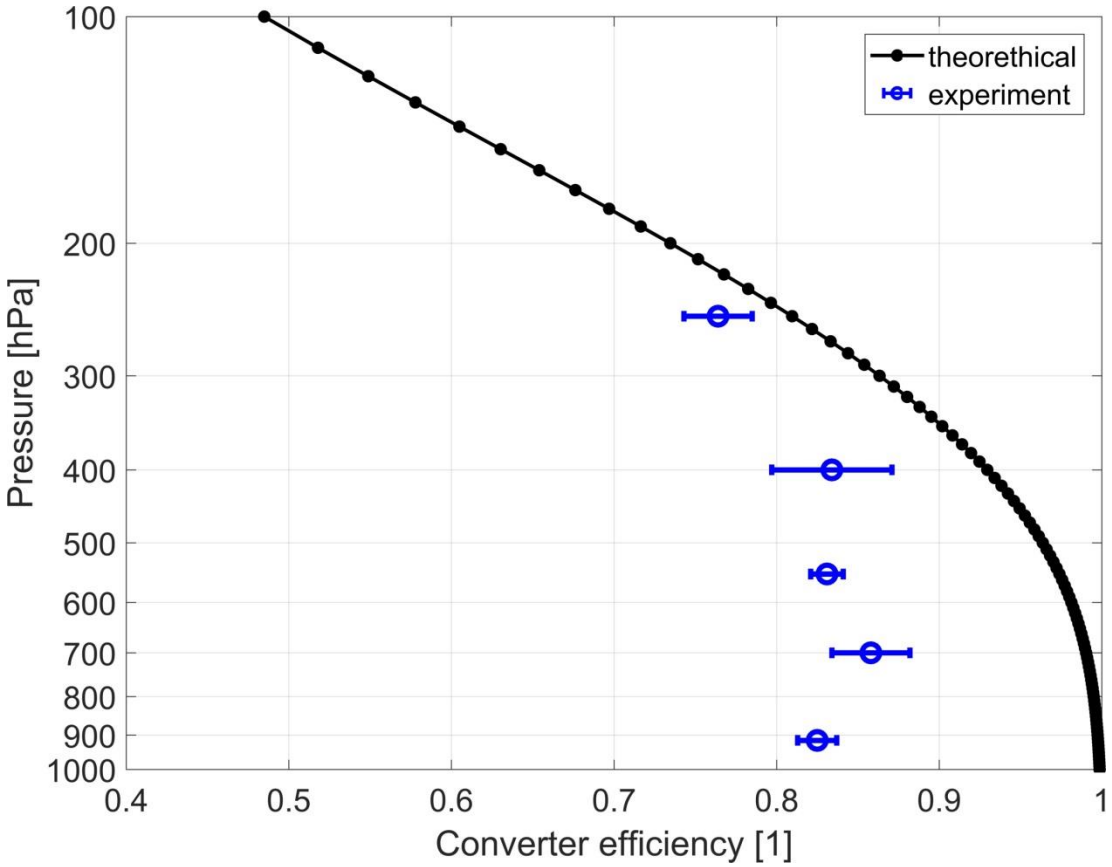


Figure S5: Experimental and theoretical converter efficiency determined for a pressure range between 180 and 1000 hPa. The residence time τ increases with higher pressure inside the PLC and leads to an increase of the converter efficiency. For each individual instrument is the function τ(p) determined.