



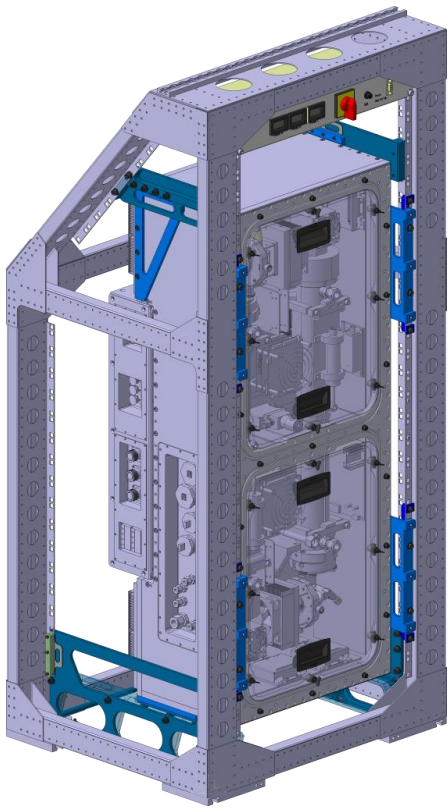
*Supplement of*

## **Airborne Mid-Infrared Cavity enhanced Absorption spectrometer (AMICA)**

**Corinna Kloss et al.**

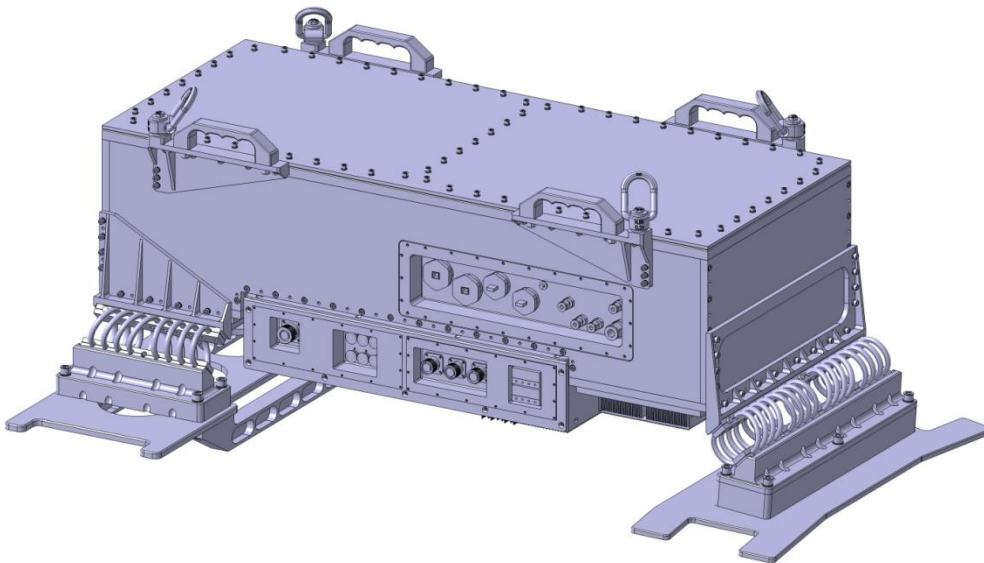
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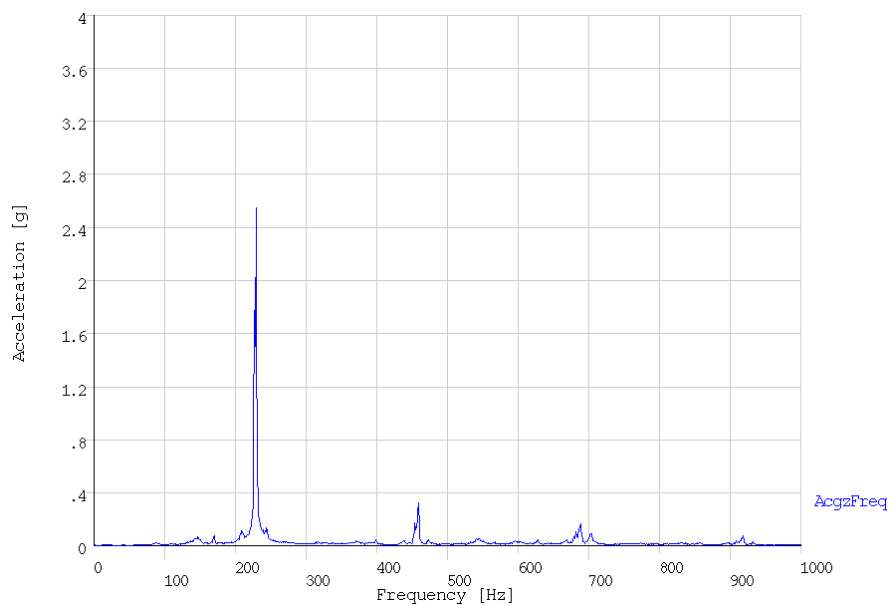


**Figure S1** Technical drawing of AMICA mounted in a HALO rack. Special mounting adapters are shown in blue colour.

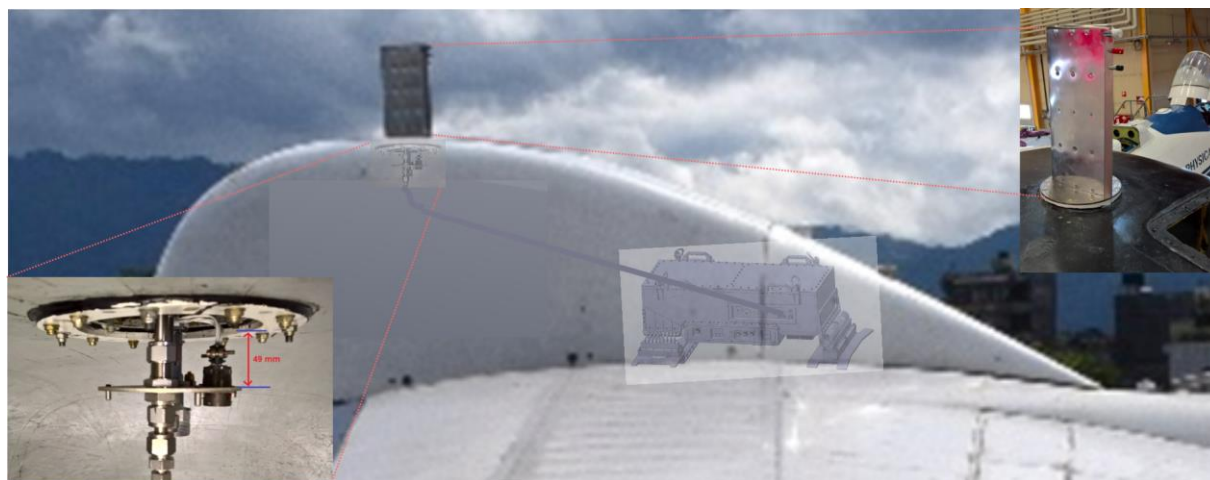
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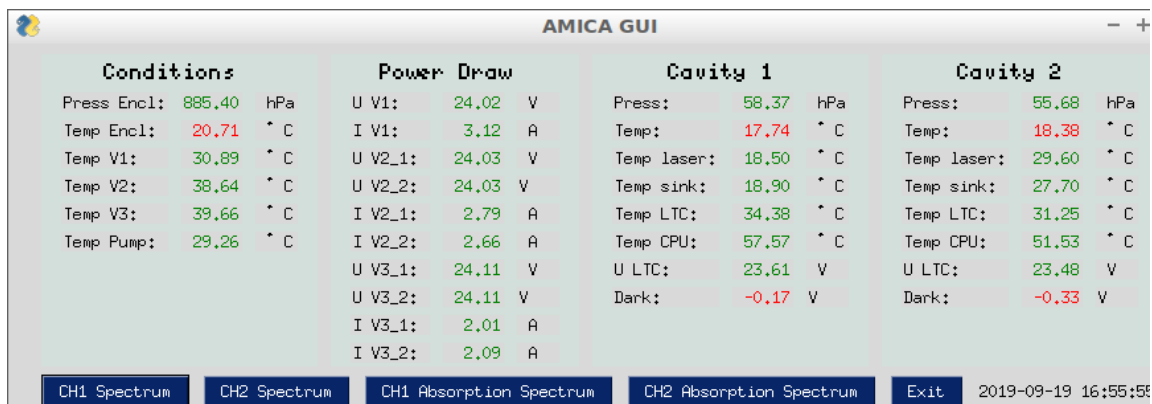
**Figure S2** Technical drawing of AMICA with M55 mounts.



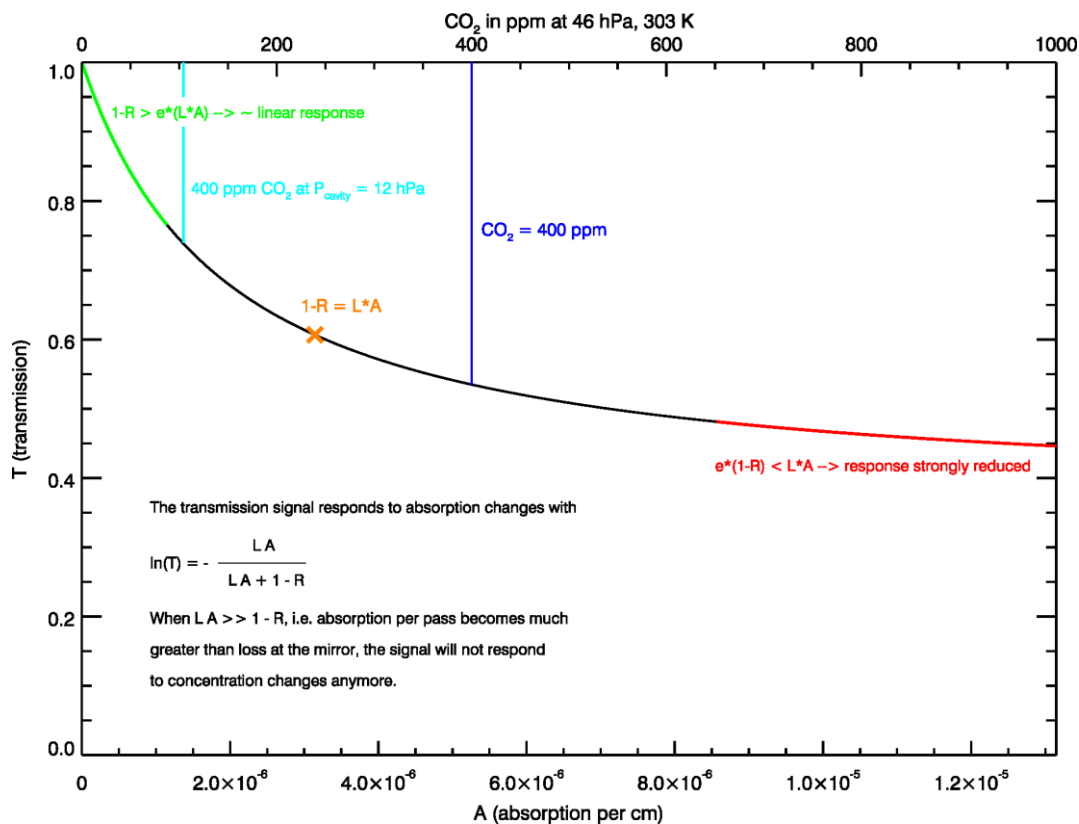
985 **Figure S3** Fast Fourier Transform of the measured acceleration signal in z-direction on the M55-side of the springs for a 30 second time window during a M55 Geophysica flight.



990 **Figure S4** Photo of the trace gas inlet mounted on the M55 Geophysica dome and two detailed photos of the inlet outside and inside the dome. The approximate position of AMICA and the inlet line to the inlet is shown in semi-transparent gray colour..



995 **Figure S5** Screenshot of the interactive version of the AMICA software. Parameters are displayed green/red when they are within/outside their respective nominal ranges (the example shown was taken just after instrument startup, when enclosure and cavity temperatures as well as preAMP dark current adjustments have not yet stabilized). Buttons on the bottom of the panel allow for displaying spectra in transmission and absorption space in separate windows.



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**Figure S6** Illustration of sensitivity reduction for the CO<sub>2</sub> peak in AMICA Setup I when the condition in Equation (3) is not met. The graph shows transmission as a function of absorption per cm  $A$ , which is converted to ppm CO<sub>2</sub> at nominal cavity pressure (46 hPa) on the top axis. Because transmission is a function of single path length  $L$ , mirror reflectivity  $R$  and  $A$  as shown in the figure, an increase in CO<sub>2</sub> mixing ratio near 400 ppm will, in the observed spectrum, lead to a broadening of the CO<sub>2</sub> peak rather than a significant increase in peak height. This effectively reduces the nominally large S/N ratio for this peak, and it makes the retrieval sensitive to even minute uncertainties in the wavenumber scale derived from the etalon fit.

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