

## CO<sub>2</sub> and CH<sub>4</sub> Measurements from the CARIBIC Aircraft Observatory

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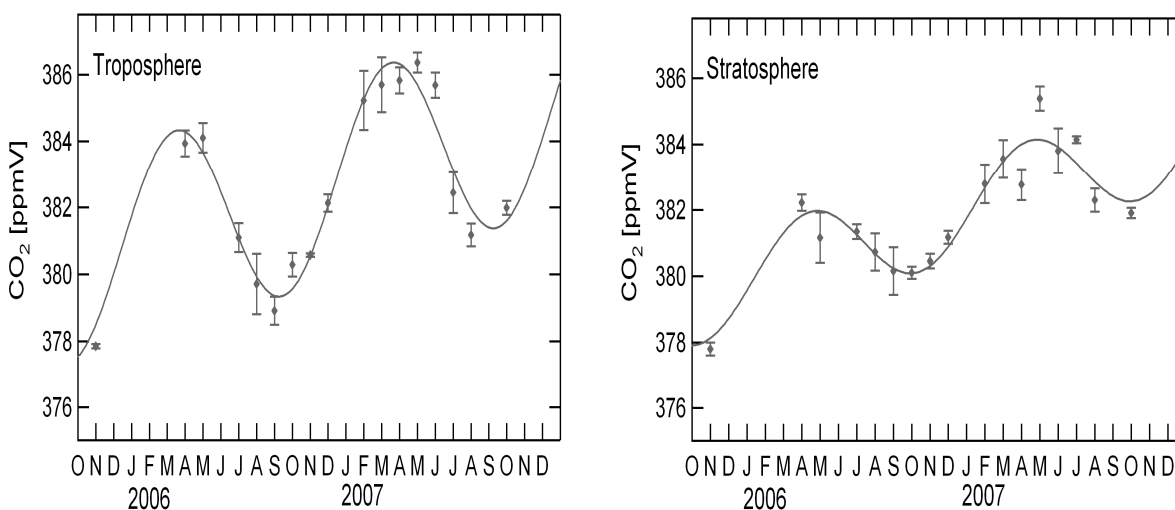
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The new CARIBIC system (Civil Aircraft for the Regular Investigation of the Atmosphere Based on an Instrument Container, [www.caribic-atmospheric.com](http://www.caribic-atmospheric.com)) is based on a fully automated instrument package. Since December 2004 it is deployed monthly aboard a Lufthansa Airbus A340-600 passenger aircraft equipped with an advanced multiprobe inlet system. The cruising altitude of 9 to 12 km implies a frequent crossing of the tropopause at mid-latitudes (the ex-tropical UT/LS region). At lower latitudes the free tropical troposphere is probed.

In addition to real-time measurements of aerosols and various trace gases, including CO<sub>2</sub>, air is sampled into glass flasks for laboratory analyses (greenhouse gases, NMHCs, halocarbons, CO<sub>2</sub> and H<sub>2</sub> isotopic composition). The main greenhouse gas analysis comprises GC measurements of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O and SF<sub>6</sub>. Data quality is assured by regular calibration measurements based on four NOAA standards. The average precision is 0.03% CO<sub>2</sub> and 0.1% for CH<sub>4</sub>. A comparison with the University of Heidelberg has shown good agreement of results.

In 2006 and 2007 monthly flights took place between Germany and East Asia and between Germany and North America. CO<sub>2</sub> and CH<sub>4</sub> data from this period will be discussed with emphasis on their correlation as a function of season and their relationship with other trace gases such as O<sub>3</sub> and CO. Furthermore, the CARIBIC data will be compared to ground station data from the ESRL Carbon Cycle Sampling Network and the CarboEurope network. A first comparison between the flask measurements and the continuous CO<sub>2</sub> measurements (LSCE, Paris) will also be shown.



**Figure 1.** Time series of the CO<sub>2</sub> mixing ratio in the upper troposphere (**left**) and lowermost stratosphere (**right**) as measured aboard a passenger aircraft by the CARIBIC observatory in 2006 and 2007.