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CARIBIC DOAS NO2 observation at Frankfurt Airport

Klaus-Peter Heue (1), Carl Brenninkmeijer (1), David Walter (1,2), Udo Frieß (2), and Ulrich Platt (2)

(1) Max-Planck-Institut für Chemie, Luftchemie, Mainz, Germany (klaus-peter.heue@mpic.de), (2) Institut für Umweltphysik, Universität Heidelberg, Heidelberg, Germany

The CARIBIC (Civil Aircraft for the Regular Investigation of the atmosphere Based on an Instrument Container) project obviously is about measurement at cruise altitude (average pressure altitude close to 10.8 km), as it uses a long range Airbus A340-600. Some information is obtained during descend and ascend, yet, to protect the inlet system from contamination, air intake stops at about 450 hPa. The DOAS (Differential Optical Absorption Spectrometry) instrument not only is a popular instrument in CARIBIC because it has no moving parts, it also is not prone to contamination. Moreover, it is the only instrument that is regularly measuring at ground level and here we report on this aspect. The instrument observes scattered sunlight under three elevation angles, one line of sight has an elevation angle of 10°; the other two are directed downwards and hence indeed are less suitable for ground based observations. In the last years a series of monthly DOAS NO_2 measurements at Frankfurt airport was taken. Other airports (CARIBIC has a range of destinations) are not considered, as there only few data points are available. At Frankfurt the observed slant column densities show a clear seasonal cycle, probably driven by the seasonal variation of incident radiation. The observed NO_2 column amount seems not to be affected by the azimuth angle of the observation, i.e. when the instruments points towards the runway or any other direction. First results of the slant and vertical columns for the years 2008 and 2009 will be shown.