



Emission of trace gases and their atmospheric transport above Southern and Eastern Asia

Sebastian Traud

Keskkonnafüüsika Instituut, Ülikool Tartu, Estonia

MOPITT satellite measurement data of carbon monoxide (CO) for the years 2005 and 2006 on the pressure levels of 850 hPa and 250 hPa has been analysed and evaluated by several methods. The results show distinct high CO concentrations above Eastern and Southeastern Asia on both levels. Furthermore, a clear seasonal cycle of pollution patterns is indicated in the visualization of the data. Despite of the found seasonal variations, Eastern Asia contributes continuously throughout the years – even in comparisons on the global scale – to a huge extent to the CO pollution in the lower and upper troposphere. From the analysed data set it can be concluded that the main contributing sources to the CO maxima in Eastern Asia are industrialized urban areas, especially along the coast of Eastern China and high rates of biomass burning (i.e. on the Indochinese Peninsula). The result that Eastern and Southern Asia have become the main contributors to global CO pollution goes with the fact of the vast economical upswing and rapidly changing industrial and society structure, which is still going on in this region.

The presentation also deals with the CARIBIC concentration data of trace gases in the upper troposphere from 2006 collected along the flight route of civil aircrafts from Frankfurt via Guangzhou to Manila and back. In order to identify proper sources and to estimate current atmospheric residential times of trace gases, calculated hydrocarbon enhancement ratios are taken into account in the evaluation of that data set. Surprisingly, additionally to the regular high pollution near the urbanized areas in Eastern Asia, even above the rural regions in Western China and Central Asia high rates of several trace gases are often observed. But that pollution can be characterized by totally different signatures of trace gas ratios. It is shown that usually pollution above Western and Eastern China stems from different sources and source regions.

As a concrete example a case study (based on CARIBIC data of the flights on 19./20. October 2006) illustrates how vertical transport to the upper troposphere occurs. It is shown that the upper troposphere over Western China is influenced by polluted air masses which have been subjected to long range transport, in that case transport of pollution originating from biomass burning in Northern India and subsequent deep convection to the upper troposphere.