TOXCA Workshop, 16. – 18.01.2013, Bremen

The **TOXCA** community made recommendations to improve the output of airborne missions investigating the oxidation capacity of the troposphere. These were based on the discussion carried out at the workshop and can be summarised as follows:

- Focussing on few good defined goals in airborne missions to build good statistics improve the scientific output of any airborne mission
- Measurement of well known background conditions over physically and chemically homogeneous areas is critically required for model intercomparison and testing.
- Chemical transport models can provide very useful information for typical locations or outflow plumes in the preparatory phase of airborne campaigns.
- Multi-aircrafts flights, for below and above cloud observations, can be very useful for the analysis of radiation balance and of deep convective episodes to characterise the tropospheric column (inflows and outflows) impacted by deep convection.
- Constant improvement of existing instruments to reduce size and weight is essential for deploying a large comprehensive set of instruments in the same platform. The combination of aerosol and trace gas measurements is particularly important for most of the studies of the oxidation capacity of the troposphere.
- Development of techniques for new measurements (organic acids, speciated organic radicals, OH reactivity, etc.) is required.
- Observations can only be compared to global models if both are reduced to the same spatial resolution. Representativeness of aircraft in-situ measurement is especially limited in the case of species of very high temporal variability.
- Vertical advective and convective motions are often poorly understood and the grid for studying the interaction of vertical versus horizontal transport in the lower troposphere has to be well adjusted to the observations.
- Statistical standard deviations of the measurements are important to evaluate the certainty of the model.
- HALO with its endurance of more than 10 h provides exciting opportunities for Lagrangian studies. An understanding of the chemical evolution cannot be achieved without consideration of physical processes like mixing during plume transport. This implies the need of extensive model support and the use of tracers to tag air masses. A good choice is the use of perfluorocarbons with PFC detection technology. Trajectory forecasts, particle dispersion, Lagrangian photochemical and chemical transport models provide additional crucial information. This is particularly important in the case of determining impact of megacities and large conurbation areas.