



Observations of halogenated trace gases in Taiwan and Malaysia

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There are a large variety of halocarbons present in the atmosphere that significantly impact on stratospheric ozone depletion and/or global warming. Though the use of some of these compounds has been phased out and replaced under global control measures, relatively long atmospheric lifetimes, imperfect substitutes and incomplete reductions in usage mean that global concentrations of halocarbons still require regular monitoring. This is especially true for the rapidly developing East Asian region, where high emissions have been repeatedly reported in recent years.

We here present results from an air sampling activity in Taiwan and Malaysia during the spring months of 2013 and 2014. A large range of halocarbons, including a number of novel gases, were investigated via high sensitivity gas chromatography mass spectrometry (GC-MS).

We find periods of relatively clean air as well as episodes that appear to be impacted by urban and/or industrial emissions and examine correlations between individual species. Observed mixing ratios are compared in context with both global background data and other regional studies. Enhancements in the abundances of many halocarbons are detected with examples including the Halons 1211 and 1202 as well as the very long-lived perfluorocarbons $c\text{-C}_4\text{F}_8$, C_5F_{12} and C_7F_{16} . We also show and evaluate unusually high mixing ratios of other globally growing halocarbons such as sulphur hexafluoride (SF_6), HCFC-133a ($\text{CF}_3\text{CH}_2\text{Cl}$), and CFC-113a (CF_3CCl_3). Finally, we use NAME analysis to produce back-trajectories in order to assess possible regional emission sources.