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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Comprehensive two-dimensional gas chromatography (GCxGC) measurements of volatile organic compounds in the atmosphere" *by* X. Xu et al.

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The comment that GC-MS has been a very powerful tool in the analysis of VOCs in the atmosphere is certainly without question. I would add however that although searching back through literature does indeed show up many hundreds (and probably thousands) of compounds which have been identified in air by GC-MS, this large number have not necessarily been determined by a single instrument at a single location. Nor does a simple number count of compounds identified give a feel for the degree to which complete separation has been achieved within a particular volatility range.

The great strength of GC-MS is that a degree of selectivity can be added to the measurement by using methods such as single ion monitoring, and this is used widely in the

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field since it also gives additional sensitivity to the method. But by its very nature it is discriminate and chemical information must be lost. I think perhaps the most important development GCxGC brings is that it is universal and allows a complete overview of the VOC content, without the need for self-selection of measurements through choice of ions. There are without doubt compound types that are much better served by a GC-MS approach, - certainly those which yield large fragment or unique molecular ions. But there are important classes of species, particularly those longer chain HC based organics which the authors report, that are too structurally similar and isomerically complex to be fully resolved using only a single separation and mass spectrometry. I would argue strongly that the degree of speciation (not simply the number of compounds) that has been reported in this paper (and from measurements made in relatively clean air, and in the field), is certainly as good if not better than I have seen published using GC-MS techniques.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 1139, 2003.