



Iodide Chemical Ionization Mass Spectrometry for Trace gas Measurement in Different Environments

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Chemical Ionization Mass Spectrometry (CIMS) is a versatile and specific technique to simultaneously measure various atmospheric trace gases with good temporal resolution and detection limits in the ppt range (Huey et al., 1995). Our Iodide-CIMS with polonium ionizer and quadrupole mass filter has been used in the past to make measurements of halogenated and organic nitrates and peracetic acid (Phillips et al., 2012; Phillips et al., 2013). Here we present a modified I-CIMS instrument with an electrical discharge ion source that is able to detect a wider variety of gas-phase molecules including peroxyacyl nitrates (PANs), peracetic acid (PAA), ClNO₂, HCl, SO₂ and organic acids. We show the results of three different field campaigns that took place in maritime, mixed urban/rural and forested environment and outline the instrumental design and the ion chemistry involved. In aged marine air masses (CYPHEX 2014) we measured elevated levels of HCl, ClNO₂ and SO₂, whereas in the boreal forest (IBAIRN 2016) organic acids resulting from biogenic VOC oxidation were predominant. In mixed urban/rural sites (NOTOMO 2015) both low- and high-NO_x conditions were encountered and SO₂, PAN, PAA, HCl and ClNO₂ were observed.