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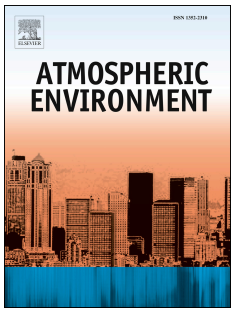

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ACCEPTED MANUSCRIPT

Enhanced ozone loss by active inorganic bromine chemistry in the tropical troposphere

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Abstract: Bromine chemistry, particularly in the tropics, has been suggested to play an important role in tropospheric ozone loss (Theys *et al.*, 2011)) although a lack of measurements of active bromine species impedes a quantitative understanding of its impacts. Recent modelling and measurements of bromine monoxide (BrO) by Wang *et al.* (2015) have shown current models under predict BrO concentrations over the Pacific Ocean and allude to a missing source of BrO. Here, we present the first simultaneous aircraft measurements of atmospheric bromine monoxide, BrO (a radical that along with atomic Br catalytically destroys ozone) and the inorganic Br precursor compounds HOBr, BrCl and Br_2 over the Western Pacific Ocean from 0.5 to 7 km. The presence of 0.17-1.64 pptv BrO and 3.6-8 pptv total inorganic Br from these four species throughout the troposphere causes 10-20% of total ozone loss, and confirms the importance of bromine chemistry in the tropical troposphere; contributing to a 6 ppb decrease in ozone levels due to halogen chemistry. Observations are compared with a global chemical transport model and find

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