

Interactive comment on “Measurements of electric charge separated during the formation of rime by the accretion of supercooled droplets” by R. A. Lighezzolo et al.

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WE APPRECIATE THE PERTINENT REVIEWER’S COMMENTS ABOUT THE TEMPERATURE RANGE OF THE HALLETT-MOSSOP MECHANISM.

"The Bader et al 1974 paper on droplet splintering on accretion has not become the established work on the subject because they had a low impact velocity and used droplets > 15 μm radius, which is larger than the droplets involved in splintering in natural clouds."

IT IS A GOOD POINT AND WILL BE CLARIFIED IN THE REVISED MANUSCRIPT.

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"General comment Only 1% of ejected particles carry measurable charge – so the other 99% may carry charges that are below the detection threshold, but which may collectively add up to a significant larger charge than that detected. Extrapolating the measured charges to smaller values may provide a value to determine whether this is the case. For example, every undetected charged fragment could carry 0.5 fC while the average charge on 1% of fragments is 14 fC."

IN CASE THAT EVERY UNDETECTED CHARGED FRAGMENT CARRY 0.5 FC, THEN THE CHARGE ACQUIRED BY THE GRAUPEL PARTICLE COULD INCREASE BY A FACTOR 4.5. IT WILL BE INCLUDED IN THE REVISED MANUSCRIPT.

"p23358 The charge on the fragments could be due to them stripping the negatively charged surface layers of the water droplets during the separation and breakup process."

THERE IS STILL IMPORTANT CONTROVERSY IF THE LIQUID WATER SURFACE IS BASIC OR ACIDIC. SEE THE ARTICLE FROM PETERSEN AND SAYKALLY 2008 [CHEMICAL PHYSICS LETTERS 458, 255–261]

"p23358 line 25 50 fC min⁻¹ and line 26 charging rate should be min⁻¹ mm⁻² ??"

CORRECT.

"p23359 line 5 charges"

OK.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 23349, 2009.

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