

## **Supporting information for**

### **Electric Field Enlarges Raindrops beneath Electrified Clouds: Observational Evidence**

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#### **Content of this file:**

**Text**

**Figure S1-S2**

**Table S1**

## **Texts:**

### **A. The growth equation by condensation:**

The growth equation by condensation of water vapour into cloud condensation nuclei can be expressed as (equation 1)

$$\frac{dr}{dt} = \frac{S-1}{F_k+F_d}$$

$F_k$  is associated with heat conduction which can be expanded as

$$F_k = \frac{L\rho_w}{k_a T_\alpha} \left( \frac{LM_w}{TR} - 1 \right)$$

And  $F_d$  is associated with vapour diffusion which can be expanded as

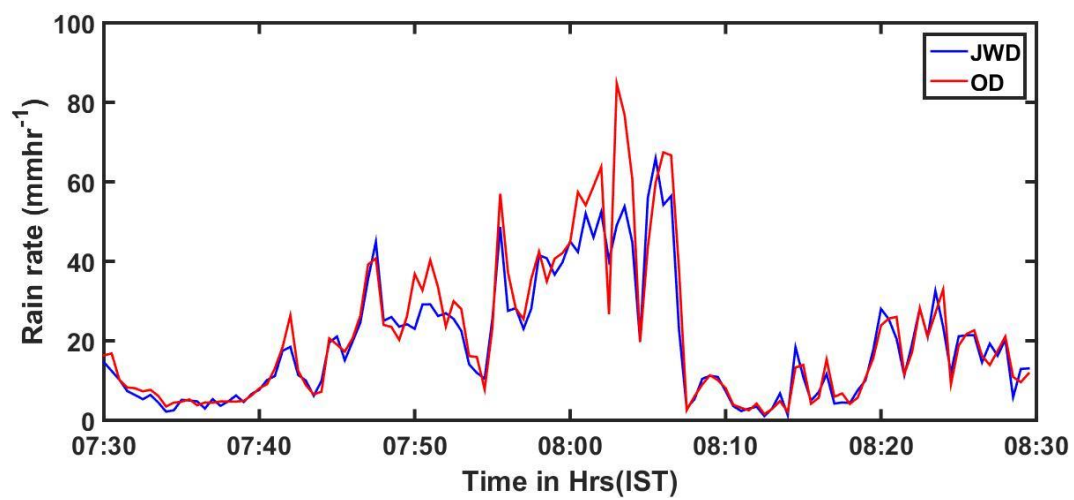
$$F_d = \frac{\rho_w R T_\alpha}{e_{s,l}(T_\alpha) D M_w}$$

Here,  $r$  is droplet radius,  $\rho_w$  is liquid water density,  $T_\alpha$  is ambient temperature,  $e_{s,l}(T_\alpha)$  is saturation pressure over a plane clean liquid water surface,  $M_w$  is Molar mass of water,  $L$  is the latent heat of evaporation of water,  $R$  is gas constant,  $k_a$  Heat conductivity of air (corrected for kinetic effects below mean free path) and  $D$  is Diffusivity of water in the gas phase (corrected for kinetic effects).

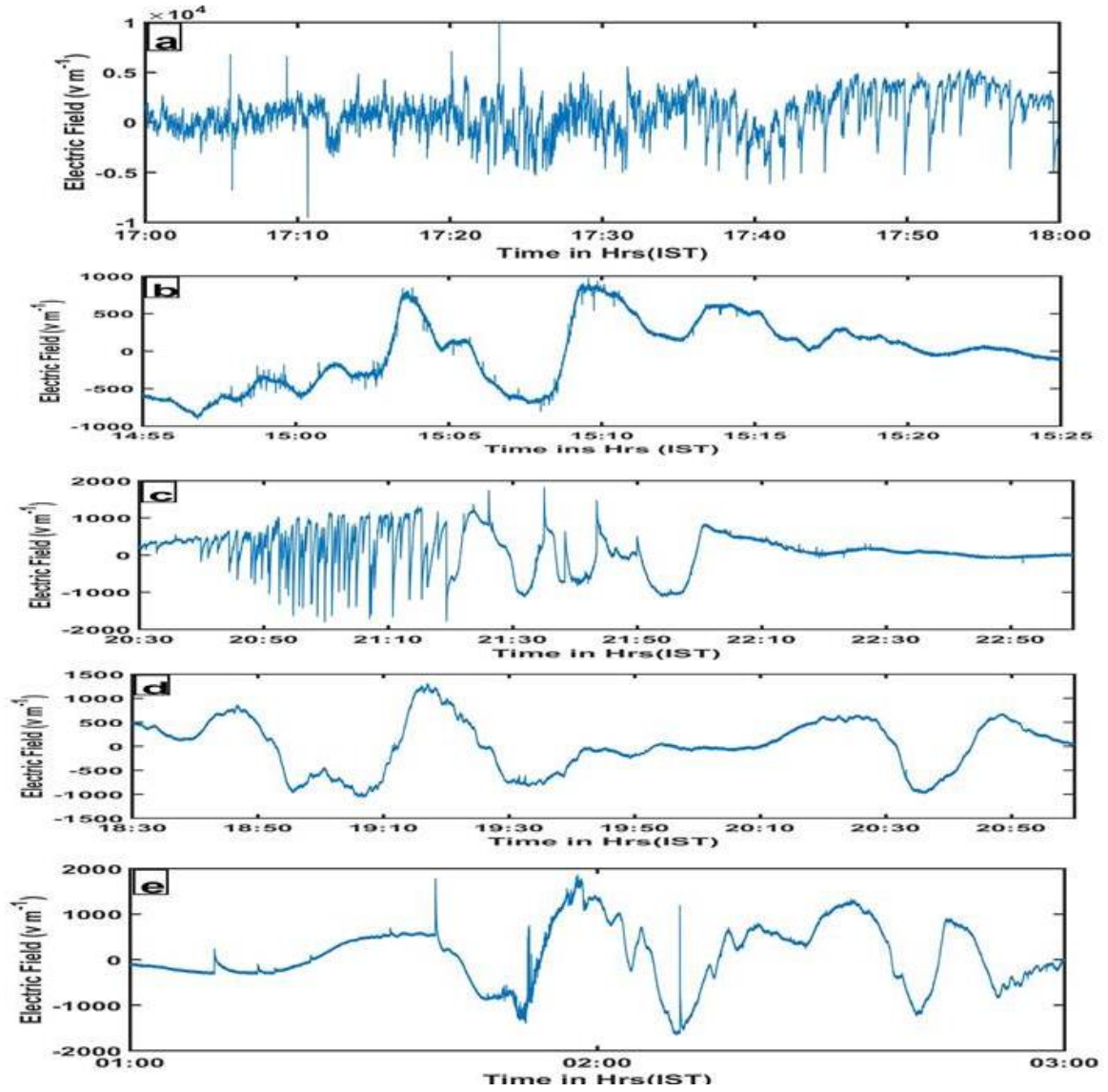
### **B. Validation of the optical disdrometer measurement**

To validate the measurement of the optical disdrometer (OD), the rain intensity recorded by this disdrometer is compared to the same recorded by a collocated JW impact disdrometer (JWD). The JWD sensor transforms the mechanical momentum of an impacting raindrop into an electrical pulse. The amplitude of the recorded pulse is roughly proportional to the mechanical momentum produced by the raindrops. The output information is voltage amplitude, which is a measure for the size of the impacting drop. Figure S1 shows the comparison between both the measuring instruments. It is observed that rain intensities measured by both the instruments are comparable to each other.

### C . Figures



**Figure S1:** Comparison of rain intensities recorded by collocated JW disdrometer (JWD) and Optical disdrometer (OD).



**Figure S2:** The vertical component of the atmospheric electric field for the 5 rain events observed over the Atmospheric Electricity Observatory (AEO). The label is the same as the Table S1. The sampling resolution is 10 samples sec<sup>-1</sup>. The observed transient high-frequency fluctuation of the field is caused by lightning discharges. IST indicates Indian Standard Time.

**Tables:**

**Table S1:** The five rain events selected for the study observed over the Atmospheric Electricity Observatory(AEO), Pune, India.

Dates	label
3rd June 2008	a
1 Sept. 2008	b
31 August 2008	c
8 Sept. 2008	d
9 Sept. 2008	e