

Physics 535 – Lecture 9

Physics of Lightning

Discussion of Field Mill record for a small mountain storm

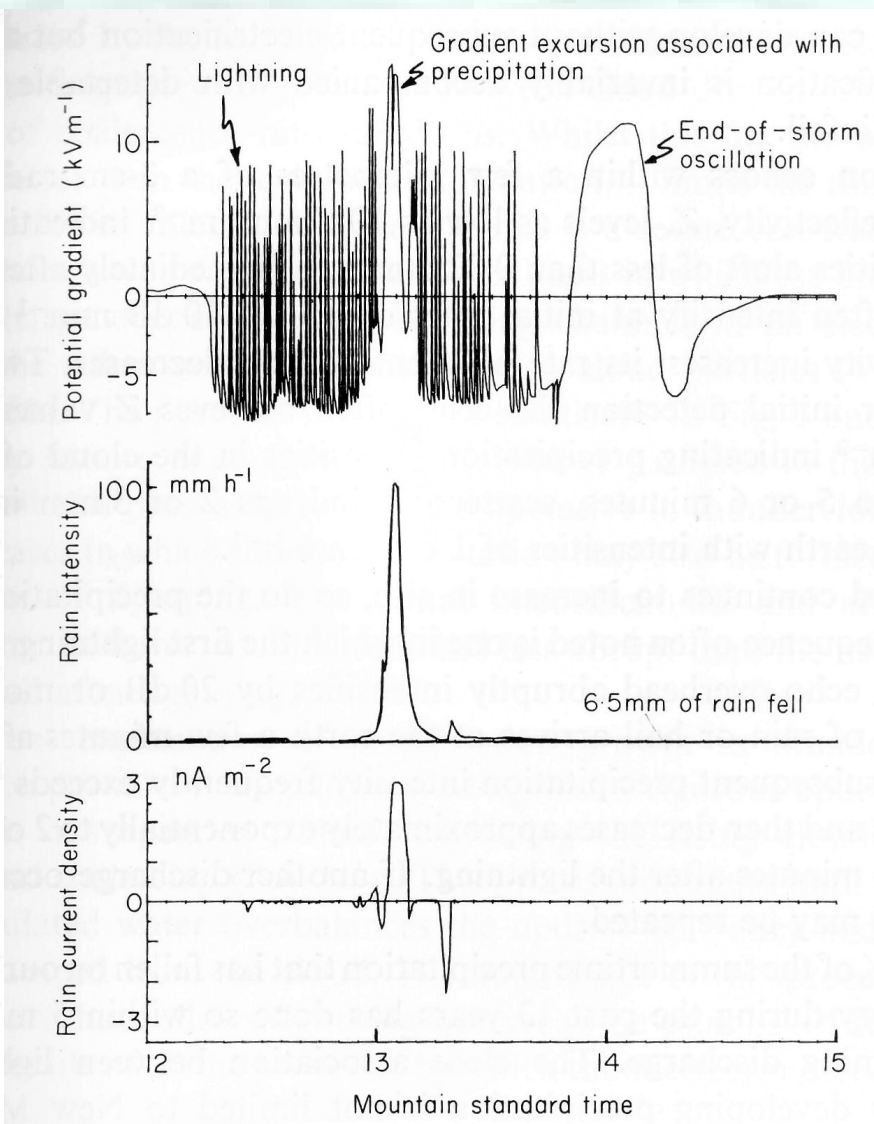
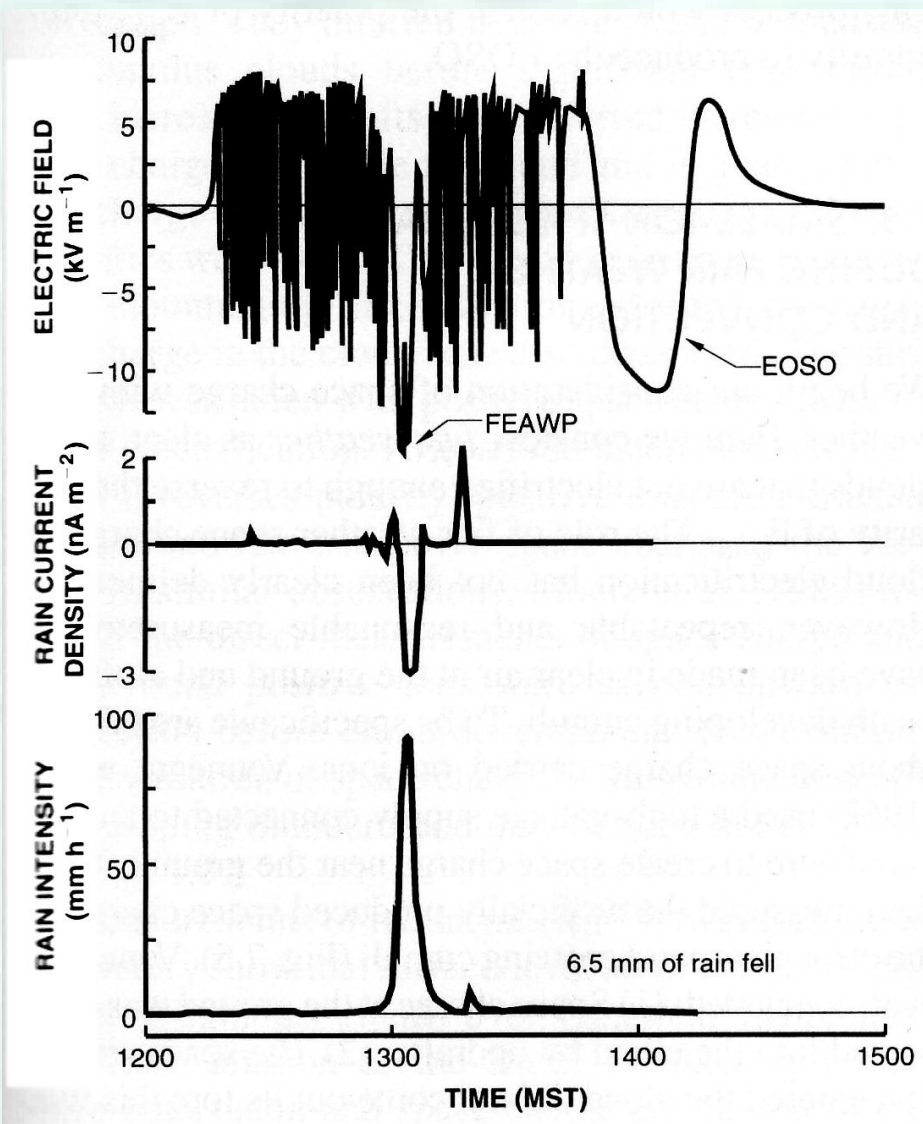
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Richard Sonnenfeld

**Physics Department &
Langmuir Laboratory for Atmospheric Physics
New Mexico Institute of Mining and Technology**

(Photo courtesy of Harald Edens)

Electrical Activity of a Small Mountain Storm



From Moore and Vonnegut, "The Thundercloud" (R.H. Golde, editor) (1977)
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Features to Discuss

Each negative CG causes a negative field change.

After the CG, the field ramps rapidly back up to a positive value (negative charge overhead). However, it never exceeds about 8 kV/m.

Why? Corona coming off of bushes puts positive space charge overhead, and limits the upward field.

Is the entire excursion from a negative field to a positive field caused by corona? (Or does it reflect the charging processes of the storm overhead?). Look at what happens at zero field. Should Corona processes stop? Should they change sign?

Features to Discuss

FEAP. “Field Excursion Associated with Precipitation”

Field becomes negative, associated with positive charge approaching. However, we assumed that precipitation was charged negatively. There is a problem here. Does the precip. Change sign by picking up positive ions from the ground? Does it pick up charge in the LPCC?

EOSO – Field suddenly swings to negative (+ charge overhead). The charging mechanism has stopped, the negative charges have fallen out. The Upper positive charge layer is slower to disperse.

This is also part of storm when Positive CG's are seen.