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## Investigating the influence of cosmic rays on atmospheric electric fields and tropical temperature anomalies using GRAPES-3

The atmospheric electric field (AEF) is an important property of the Earth's atmosphere and varies because of the effects of local weather, seasonal variations, and global electrical circuits. During fair weather conditions, the AEF is measured to have an ambient field of about a few hundred volts per meter (V/m) near the ground. The resultant positive field is an outcome of a complex process of electrification of the atmosphere of the Earth. Hence, the ambient field is dependent on various local weather parameters such as wind, humidity, temperature, pressure, etc. Moreover, cosmic rays (CRs), which are high-energy particles originating from outer space, play a crucial role in influencing the AEF. Studying these variations helps us better understand weather, climate, and how the Earth's surface interacts with the atmosphere. GRAPES-3 is a ground-based CR observatory located at Ooty on the Nilgiri plateau in India. In April 2011, four electric field mills (EFMs) were installed around GRAPES-3 to study how CR secondaries interact with AEF; since then, they have been in continuous operation of measuring AEF every 50 milliseconds. We studied the time variation of the ambient AEF measured from these four EFMs since April 2011 with the CR measurements and also found a modest connection with the tropical temperature anomaly.

### Collaboration(s)

GRAPES-3

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