



## **On the efficacy of radionuclide emission as a control on surface electric field, the micrometeorological constraint**

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### **Abstract**

It is well-known that atmospheric electric field is controlled locally by the air conductivity and space charge gradient/concentration, any other factor manifesting itself in the form of these two parameters. The determinant of air conductivity is the radionuclide emission from the earth's surface and that of space charge gradient is the lapse rate at a place. A study over a period of a year to bring out the relative effects these two factors have on modification of electric field establishes that, though perennially both the factors are at work, they affect depending on their relative concentration/magnitude. Radionuclide concentration was the highest in winter and lapse rate variation in summer, hence radioactivity modified field in winter primarily and lapse rate co-related well in summer. Radon daughter emission is the primary contributor to the air conductivity and hence electric field, but as a control it is limited by the micro-meteorological conditions prevailing then. Similarly, radon could be used as a tracer effectively to study aerosol concentration in general or a species in particular for its ion-attachment properties, but one needs to consider the micro-meteorological factors into consideration. Shown below is the plot of electric field variation against radon concentration and lapse rate for inversion conditions for different seasons. It is noticeable that both factors have dissimilar effects on electric field in different seasons depending on their magnitude.