



## **An analysis of Potential Gradient, CO<sub>2</sub> and meteorological parameters relationships at a rural site**

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A full year of measurements of atmospheric electric field (Potential Gradient – PG), standard meteorological parameters (temperature, relative humidity, wind speed and global radiation) and atmospheric CO<sub>2</sub> (06/2011 - 05/2012) at a rural site in northern Greece (Kimeria, Xanthi) have been used to study the local electrical climatology.

In fair weather (FW) conditions, although both global and local effects determine the diurnal variation of PG, local influences in Kimeria are by far more intense. While the first maximum appears at about 11:00 to 13:00 LT as a result of the morning convective conditions and human activity, the second one occurs at around 20:00 to 22:00 LT and is mainly the result of global thunderstorm activity. Two daily PG minima occur at approximately 5:00 and 19:00 LT. The seasonal variation in the timing of the diurnal extremes is attributed to seasonal effects and variations in local parameters. The annual variation of the mean monthly values is consistent with ones reported for other sites. A winter maximum in PG is observed in February, while a summertime minimum is evident. High values of PG in June 2011 might be the result of biomass burning in the area.

In all weather (AW) conditions, mean diurnal PG appears to be continuously lower than the FW one, while the maximum of the AW and FW mean diurnal standard deviation is at around 16:00.

The relationship of standard meteorological parameters and PG was also examined under different atmospheric conditions. Finally, atmospheric CO<sub>2</sub> measurements, together with meteorological data, were used as an indicator of the transition from nocturnal temperature inversion to daytime convective conditions and the behavior of PG was analyzed.