



Atmospheric Electric Field Measurements at 100 Hz and High Frequency Electric Phenomena

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Spectral response of Atmospheric Electric Potential Gradient (PG), symmetric to the Atmospheric Electric Field, gives important information about phenomena affecting these measurements with characteristic time-scales that appear in the spectra as specific periodicities. This is the case of urban pollution that has a clear weekly dependence and reveals itself on PG measurements by a ~ 7 day periodicity (Silva et al., 2014). While long-term time-scales (low frequencies) have been exhaustively explored in literature, short-term time-scales (high frequencies), above 1 Hz, have comparatively received much less attention (Anisimov et al., 1999). This is mainly because of the technical difficulties related with the storage of such a huge amount of data (for 100 Hz sampling two days of data uses a ~ 1 Gb file) and the response degradation of the field-meters at such frequencies. Nevertheless, important Electric Phenomena occurs for frequencies above 1 Hz that are worth pursuing, e.g. the Schumann Resonances have a signature of worldwide thunderstorm activity at frequencies that go from ~ 8 up to ~ 40 Hz. To that end the present work shows preliminary results on PG measurements at 100 Hz that took place on two clear-sky days (17th and 18th June 2015) on the South of Portugal, Évora (38.50° N, 7.91° W). The field-mill used is a JCI 131F installed in the University of Évora campus (at 2 m height) with a few trees and two buildings in its surroundings (~ 50 m away). This device was developed by John Chubb (Chubb, 2014) and manufactured by Chilworth (UK). It was calibrated in December 2013 and recent work by the author (who is honored in this study for his overwhelming contribution to atmospheric electricity) reveals basically a flat spectral response of the device up to frequencies of 100 Hz (Chubb, 2015). This makes this device suitable for the study of High Frequency Electric Phenomena.

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