EMS Annual Meeting Abstracts,
Vol. 6, EMS2009-337, 2009
9th EMS / 9th ECAM


9th EMS Annual Meeting
9th European Conference on Applications of Meteorology
High resolution meteorology
- applications and services

# On temporal spectra of scintillometers

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Clifford (1971) derived expressions for the real and imaginary part of the temporal spectra $W(f)$ for spherical waves propagating through the atmosphere. To a good approximation, the transmitter of a Millimeter-Wave Scintillometer (MWS) can be regarded as a point source and thus Clifford's theory is applicable to a MWS. Nieveen et al. (1998) extended Clifford's theory to large aperture scintillometers (LAS). In both cases a so called corner frequency, $f_c$ , can be defined. For frequencies smaller than $f_c$ , the real part of $W(f)$ is approximately constant at $W_{plateau}$, whereas for $f > f_c$ , the real part of $W(f)$ is proportional to $f^{-8/3}$ for the MWS. It is noted that $W_{plateau}$ is inversely proportional to the cross wind $u_c$ and that $f_c$ is proportional to $u_c$, therefore the integral of $W(f)$ over all $f$is independent of $u_c$; however, this applies for the case where the cross wind does not vary along the path. During a field experiment carried out in mid-summer 2006 at Sheepdrove Organic Farm, UK, over mixed agricultural land use and complex topography, $W(f)$ was measured by a 94 GHz MWS. There were contrasting cool-windy and hot-convective weather conditions during the experiment. With these data the Clifford theory will be validated.