



A spatial structure function analysis of ionospheric velocity fluctuations.

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Generalised structure functions have proved a useful tool in the characterisation of scale free systems. Here we present a spatial structure function analysis of plasma flow velocities measured in the ionosphere. The data set consists of 8 years of line of sight velocity data from the Halley SuperDARN radar in Antarctica. We compare contemporaneous measurements of meridional velocities at different range separations. Our analysis shows strong evidence for scale free behaviour in the ionospheric velocity field and we have found that it is possible to collapse the distributions of fluctuations at different separations to a single distribution using appropriate scaling. Due to the limited dynamic range of the measurements we have had to limit our analysis of fluctuations to 3 standard deviations. We investigate, using a fractional Lévy generator, the effect of this clipping and the effect of signal aliasing by the radar on our ability to characterise a scale free system.