Geophysical Research Abstracts,
Vol. 11, EGU2009-12136, 2009
EGU General Assembly 2009

A first order geometric auto regressive process for boundary layer wind speed simulation

T. Laubrich and H. Kantz

Max Planck Institute for the Physics of Complex Systems, Dresden, Germany (laubrich@pks.mpg.de)

The first order geometric auto regressive (AR) process has statistical properties similar to atmospheric boundary layer wind speed. In this contribution, we investigate this similarity and analyse the extent to which this stochastic process is a suitable model for wind speed simulation.

In particular, we focus on the fluctuation of this process around its moving average. We show that the standard deviation of the fluctuation is proportional to the value of the moving average. This has also been observed in atmospheric boundary layer wind speed data [1]. Furthermore, we show that the increment distribution of the geometric AR(1) process is in good agreement with the Castaing distribution [2] found in turbulence.

References

[1] T. Laubrich, F. Ghasemi, J. Peinke, and H. Kantz, *Statistical analysis of wind speed fluctuation and increments of non-stationary atmospheric boundary layer turbulence*, arXiv: 0811.3337

[2] B. Castaing, Y. Gagne, and E.J. Hopfinger, *Velocity probability density-functions of high reynolds-number turbulence*, Physica D, **46** (1990), 177