

## MULTIFRACTAL ANALYSIS OF HOURLY WIND SPEED RECORDS IN PETROLINA, NORTHEAST BRAZIL

Bárbara Camboim Lopes de FIGUEIRÊDO<sup>1</sup>  
Guilherme Rocha MOREIRA<sup>1</sup>  
Borko STOSIC<sup>1</sup>  
Tatijana STOSIC<sup>1</sup>

- **ABSTRACT:** *We investigate multifractal properties of hourly wind speed records from Petrolina, PE during the period 2008-2011. We use Multifractal detrended fluctuation analysis (MF-DFA), method that was successfully applied to quantify multifractality in non stationary temporal series. Our results show that temporal series of average wind speed and maximum wind speed exhibit multifractal properties. We find that both small and large fluctuations display persistent long term correlations indicated by the values of generalized Hurst exponents, which are above 0.5 the value that characterizes uncorrelated regime. The maximum wind speed shows stronger multifractality than average wind speed indicated by larger width of multifractal spectrum. After shuffling the series, we find that for maximum wind speed multifractality is due to a broad probability density function, while for average wind speed the multifractality arises from both a broad probability density function and long-term temporal correlations.*
- **KEY-WORDS:** *Wind speed; multifractals; MF-DFA.*

---

<sup>1</sup> Universidade Federal Rural de Pernambuco - UFPE, CEP: 52171-900 - Recife, PE, Brasil. E-mail: [babitaa@hotmail.com](mailto:babitaa@hotmail.com); [guirocham@gmail.com](mailto:guirocham@gmail.com); [borkostosic@gmail.com](mailto:borkostosic@gmail.com); [tastosic@gmail.com](mailto:tastosic@gmail.com)