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Adaptive Local Iterative Filtering: a promising technique for the analysis of non–stationary signals.

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Many real life signals, and in particular in the space physics domain, exhibit variations across different temporal scales. Hence, their statistical momenta may depend on the time scale at which the signal is studied. To identify and quantify such variations, a time-frequency analysis has to be performed on these signals. The dependence of the statistical properties of a signal fluctuations on the space- and time-scales is the distinctive character of systems with non linear couplings among different modes. Hence, assessing how the statistics of signal fluctuations vary with scale will be of help in understanding the corresponding multi-scale statistics of such dynamics. This paper presents a new multi-scale data analysis technique, the Adaptive Local Iterative Filtering (ALIF) which allows to describe the multi-scale nature of the geophysical signal studied better than *via* Fourier Transform, and improves scale resolution with respect to Discrete Wavelet Transform (DWT). The example of geophysical signal, to which ALIF has been applied, is ionospheric radio power scintillation on L-band. ALIF appears to be a promising technique to study the small scale structures of radio scintillation due to ionospheric turbulence.