

# **SIGNAL THEORY AS A TOOL TO STUDY EFFECTS OF COSMIC RAYS, SOLAR ACTIVITY AND AFRICAN DUST ON NORTH ATLANTIC HURRICANES**

**Jorge Pérez-Peraza** and Victor Velasco-Herrera

Instituto de Geofísica, Universidad Nacional Autónoma de México, C.U., Coyoacán,  
04510, México, D.F., MEXICO

In order to study the influence of different terrestrial and cosmophysical phenomena on North Atlantic Hurricanes, we study here the effects of Galactic Cosmic rays (**GCR**), Solar activity (**SS**), Sea-Surface Temperature (**SST**), Atlantic Multidecadal Oscillation (**AMO**) and African Dust (**AD**) on North Atlantic Hurricanes of all categories. To do so, we use the so called *Wavelet-Coherence Spectral analysis* which is known to be one of the most powerful tools of Signal Theory. Such analysis leads to establish the evolution in frequency and time, as well as the phase between two time series, allowing to infer whether there is a linear correlation, or, an anticorrelation between the two given phenomena. Results indicate that among the prominent common signals for Hurricanes, **SST**, **AMO** and **GCR** is one with period of  $30 \pm 2$  yrs., which is not the case with **SS** where the most intense signals remain at the 11 and 22 yrs. frequencies. Due to the short period of **AD** data (since 1965) the most prominent common signals with hurricanes of different categories are in the range 0.25 - 11 yrs. A clear anticorrelation is found between Hurricanes of the highest categories with African Dust: when the intensity of Dust storms is high (2005-2006 for instance) the number of high magnitude hurricanes (mainly magnitude 5) is lower. The persistent frequency at 11 yrs. in **SST** and Tropical Storms points to a connection between these phenomena and a phenomenon that could be the Solar Activity. The higher level of coherence between **GCR** and Hurricanes relative to that between **AD** and hurricanes indicates a stronger modulation effect by **GCR** that needs to find an explanation.

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Jorge Pérez-Peraza, IGEOF, UNAM, C.U., Coyoacán ,04510, México, D.F., MEXICO