

INTERPRETING THE TRENDS OF EXTREME PRECIPITATION IN FLORIDA THROUGH PRESSURE CHANGE

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Precipitation is one of the many significant natural factors impacting agriculture and natural resource management. Although statistics and other data technologies have been applied to investigate the non-stationary trend and the unpredictable variances of these events under climate change, existing methods usually lack a sound physical basis that can be generally applied in any location and any time especially in tropical areas whose atmospheric systems are relatively unstable due to high solar radiation. In this paper, Pressure Change Events (PCE) will be used as a physical indicator for atmospheric systems stability to unfold the impact of temperature on precipitation in the tropical area of Florida. By using data from both national and regional weather observation networks, this study segments the continuous observation series into PCE sequences for further analysis divided by dry and wet seasons. The results reveal that the frequency and intensity of PCE are highly associated with the occurrences of weather events. The frequency of the alternating between Increasing Pressure Change Events (InPCEs) and Decreasing Pressure Change Events (DePCEs) is subject to the temperature of the season and climate. Affected by the seasonal fluctuations of weather characteristics, such as temperature, the dependence of extreme precipitation on these characteristics can be interpreted via PCE. A 7% increase rate of precipitation vs. temperature rise can be observed from extreme precipitation with variances on season and PCE types. Although indicated by other research, active vertical movement of air caused by phase change of water at frozen point is not pronounced in Florida, especially in South. In summary, PCE is a reliable physical evidence of precipitation formation and can better associate the occurrence and intensity of extreme weather with other characteristics. In turn, such associations embody the underlying physical concepts holding at any location in the world.

PRESENTER BIO: Mr. Songzi Wu is currently a Ph.D. student in Department of Agricultural and Biological Engineering at University of Florida, being advised by Dr. Ziwen Yu. Wu's research interests are big data, AI, machine learning and deep learning.