ADVENTURES OF STATS GIRL

STATISTICS SAVES THE PLANET

A CHANGING CLIMATE

Since its genesis, the earth's climate has been in constant flux due to solar variability. But in the last century, the planet has undergone rapid warming due to human activity. The earth's atmosphere is made up of natural "greenhouse" gasses like water vapor, nitric oxide, methane, and carbon dioxide. The atmospheric greenhouse absorbs solar energy and radiates it back to the earth's surface. The burning of fossil fuels increases the amount of greenhouse gasses in the atmosphere, contributing to global climate change. These changes pose challenges to the ecosystem and threatens the continuation of life on planet earth.

BURN!!!

IT'S GETTING HOT IN HERE...
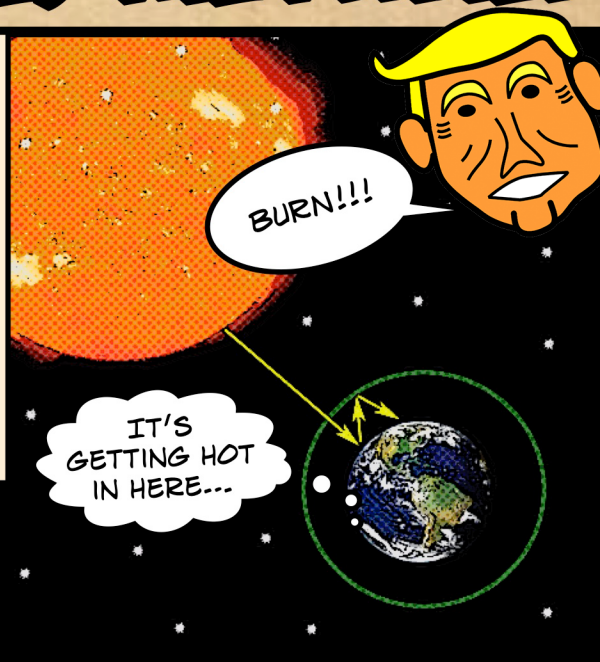
IT'S NOT EASY...
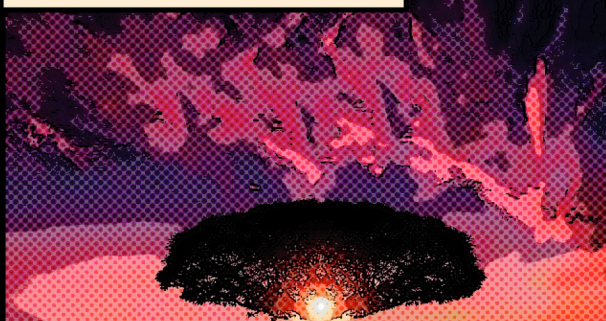
As the climate continues to change, scientists are working to understand its impact on the ecosystem. Much of the data collected are time series with complex dependence structures. While advancements have improved data precision, robust analytical methods are still lacking. Establishing comparisons between time series are difficult as classical inferential methods, such as one-way anova, do not adequately account for temporal dependence.

STATISTICS TO THE RESCUE!

Time series are often discrete realizations of a continuous process, and can be considered functional data. To compare such curves, we propose utilizing functional anova (FANOVA), a method that properly accounts for temporal dependence. We introduce novel illustrations of the FANOVA results, which provide a facet to understanding significance and elucidate when significant differences occur over time. As climate change continues, it is essential to use reliable statistical methods to quantify its effects. These analyses will be invaluable for adapting to changes, informing public policy, and combating detrimental climatic shifts.

$$x(t) = \sum_k c_k \phi_k(t)$$

$$\int x^2 dx$$

STATS

POW

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