TEXAS A&M UNIVERSITY
Statistics

The Statistics Former Student Network (SFSN) presents

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## High-Resolution Long-term Weather Data for Energy

### Abstract

The siting of future solar power generation arrays relies heavily on accurate estimates of solar radiation at an hourly time scale and high spatial resolution. While global and regional climate model projections are useful for gauging future patterns of climate variables, including solar radiation, but data from these models is often too spatio-temporally coarse, and therefore often lack the necessary detail for local applications. With the photovoltaic (PV) industry moving towards longer plant lifetimes, understanding the impact of climate change on PV production becomes crucial. We propose a novel method to downscale global horizontal irradiance (GHI) data from daily averages to hourly profiles while preserving spatial correlation. Our approach employs a diurnal template that can be adjusted based on time, location, and year. We apply this method to data from the National Solar Radiation Database and present a case study over several sub-regions of CONUS. We further assess uncertainties associated with regridding regional climate model fields, disaggregating daily totals to hourly profiles, and downscaling to a 4km resolution. The resulting multi-scale predictive model enables projections of GHI into the future, facilitating informed decisions in solar facility planning amidst a changing climate.

### Biography

Soutir earned a doctorate in Statistics (2010) at Texas A&M University. Before joining Mines he was an Assistant Professor in the Department of Mathematics (2010-2017) at Lehigh University. He has also been a visiting scientist at the Computational and Information Systems Laboratory at the National Center for Atmospheric Research studying climate models. His core research approaches problems related to spatial and time series data. His expertise lies in developing novel inferential procedures under spatial (and/or temporal) dependence and investigating their asymptotic properties. Soutir's research has always been motivated by and applied to problems arising from practical situations in various areas such as climate science, environmental studies, finance, and biomedical studies, among others. He is an elected member of International Statistical Institute and the recipient of the International Indian Statistical Association Young Statistical Scientist Award.

**Monday, October 21, 2024 | 11:00 AM - 12:00 PM CST**
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