Modeling the Spatial Distribution of Fossil-Fuel Based Carbon Dioxide Emissions

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A model is developed to improve the spatial resolution of fossil-fuel based CO_2 emissions. This method is developed from a dataset that utilizes U.S. state-wise fuel sales data as a proxy for total monthly emissions. This method employs relative proportions of annual consumption to estimate monthly emissions for every state. Combining information on population and population density, a spatial model is proposed that has emissions increase logarithmically after a population density threshold is reached. Adding a density threshold greatly increases the accuracy of the spatial models for CO2 emissions. This suggests that per capita emissions decline as population density increases.