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Your's Mine and Our's II: A Further Study Into Modeling the Spread of Pollutants in the Atmosphere

The intent of this project is to provide a deeper understanding of how particles of pollution travel when released into the atmosphere. My objective was to build a computer model, using the C programming Language, to show the dispersion of pollutants introduced into the atmosphere, taking into account the impact of variable atmospheric conditions. My model showed the potential travel path of pollution particles, as influenced by real world atmospheric conditions. With a temperature inversion in effect, my model showed the particles staying trapped under the inversion, producing what we call a "brown cloud". I used an iterative procedure to implement my computer model, starting with a simple implementation of a two-dimensional random walk, and adding new variables and equations to the program one at a time. With each iteration, I plotted my data to ensure the program was working correctly. The variables I added are: wind speed and direction, air temperature, particle temperature, temperature inversion, and a realistic heating and cooling effect on the particles. As I added variables to the program, I observed that the particle went from traveling in a relatively straight line, with a small random influence, to oscillating up and down in the vertical direction due to the atmospheric conditions. From the model I have developed, I conclude that atmospheric conditions have a significant effect on the dispersion of pollutants once released into the atmosphere. In order to use such a model in real world applications, these conditions must be taken into account.