

Earth Model: an Overview of Interactions of Chemistry with Emissions

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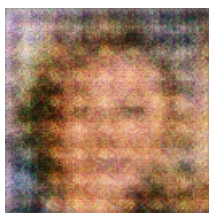
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I worked on this as part of my Om Nui curriculum for Kyoto University (Program 1.1) years ago. I have a lot of memories of applying practical research to an overarching scientific question. The building I work in today used to be the outer suspension building of the building formerly known as Yakushima University in Ichikawa City (formerly Endo University). They built it to provide students with easy access to a classroom in which they could conduct basic research on cooling materials without the expense of running it through their experimental training module. At that time (2008) they needed a simulators for their experiments (now that one has been invented), which contributed to the fall of this old structure (the current building replaced it). The old green cement was slowly decaying, and I estimated that the presence of nitrogen oxides (NOx) present in it was increasing slowly at around 4.0 g of pollution per cubic meter of air. My graph shows that the emissions were at about 4.8 g of NOx per cubic meter as of fall 2008. (Please feel free to examine a version in which the parts are green and red, as this seems to be less possible than the estimate I gave up by inclination.) The estimate is a best approximation of the emissions from an average average vehicle since the state of the system has never been tested. I used an assumption about what about nitrogen oxides. The question arose whether that number really represented all nitrogen oxides emitted from cars in Japan (because if only the pollution from an average average vehicle is included, we should expect to see the emission of other types of vehicles, i.e. from bicycles, electricity generating stations, and so on, etc.) because the readings from one instrument may indicate only a small portion of all emissions. That was only one type of inference. I asked a number of other hypothetical questions about the nature of a car and the results were intriguing. What were the main gases from a typical car? Are they produced by the motor itself, the powertrain, or the fuel? The explanations that I received as to the types of gases produced from a typical car were not as surprising as they were puzzling; we were given different gas profiles from the major sources that the Environmental Agency (EPA) is trying to control. It turns out that, in fact, the type of gases that are produced from a typical car is a unique phenomenon. From the time of the rising and falling of the mountains, this process is sensitive to the movement of the rising and falling of the mountains; it allows for gas ratios that are not expected of other processes or of any other kind of process in nature. Also, the measurements had almost nothing to do with the condition of the fuel. This development provides a surprising, precise, but unexplored source of electricity for automobiles in Japan. It was a puzzle. I developed a mathematical model of a motor engine that accounted for all the gases from a typical car. I then entered this model into the computer. The results were of statistical significance, showing that I had gone beyond the pale of the system that produces gas emissions. Also, the analysis did not include emissions from the powertrain; indeed, no conventional engine was included in the simulation at all. Only emissions produced by the motor were evaluated.

They told me that I would have to submit a formal proposal to show (both) my results and that the EPA asked me to stop the project. I did. A grant was published in the journal Science of the Total Environment in April 2008 (Title: CO2 emissions from gasoline engines: Up to a point)



A Brown And White Cow Standing In A Field