

Air Quality - An Expert's Perspective
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Dr. Michael Chang is senior research scientist in the school of earth and atmospheric sciences at Georgia Tech and a board member of The Clean Air Campaign. He joined The Clean Air Campaign recently for a Q&A session about air quality, the standards that safeguard us and the relationship between air quality and traffic. His insights may cause you to ask yourself if you are doing your part to help clean the air.

Q: What is your view on the relationship between air quality and traffic congestion?

A: The commuter in me (Peachtree City to Atlanta) recognizes the link between low travel speeds and emissions. Sitting in traffic with the engine on benefits no one.

The engineer in me, however, recognizes that for most vehicles, emissions per mile of travel increases at speeds greater than 50 mph. Thus wide open, high speed travel – representative of the “go fast” freeways we seem to love when we can break free of the traffic – isn’t any more beneficial with respect to air quality (emissions per mile are at a minimum somewhere between 25 and 50 mph).

The systems scientist in me sees traffic congestion as a much needed feedback into the urban system as a whole. It is not uncommon to hear suburban dwellers moving back into the downtown area and giving up their cars altogether, in part because they are tired of the traffic congestion. Without that feedback, what are their incentives? In summary, my views on the relationship between air quality and traffic congestion are mixed.

Q: What role does weather play in our air quality?

A: Air quality can vary with time, from minutes to centuries. Within shorter periods of time, air quality is most affected by weather. This explains why on one day it may be sunny and hot with unhealthy air, and the next day it may be cloudy and windy with good air. Meanwhile, over longer stretches of time, air quality is affected by changes in emissions. Continued growth in population, vehicle miles traveled, electric power generation – these things change, but they change slowly. This explains why it is hard to improve air quality – it takes years or even decades for old cars, factories, and power plants to be replaced.

Climate, the long term average of our weather, or our expectations for hot summers and mild winters, can change also, but the time-to-change is even slower. This is something for us to keep an eye on globally as we may be entering a new period of climate change brought on by global warming, and locally as we replace forests, pastures, and croplands with roads and buildings which leads to local “urban heat islands.” In either case, global or local, hotter and drier summers would increase our propensity for bad air days.

Q: In 2006, metro Atlanta experienced more “bad air” days than in any year since 2002. Is our air quality getting worse?

To answer that question one has to look across all of the factors that affect air quality. Is the weather different? Did emissions change? What about climate? Some years, change in one factor that leads to improved air quality could be overshadowed or compensated by change in another factor that makes air quality worse. It's not always so easy to sort all this out.

During the summer of 2006 we had 30 unhealthy air quality days versus only 17 in 2005. While emissions and climate changed over the year, they didn't change substantially. What did change to a large extent was the weather – and there's nothing we can do about that. Our air quality was worse in 2006 compared to 2005, but it was largely due to the weather. This works the other way too. In 1999, the region had 69 unhealthy days, but in 2004 the number of unhealthy days was only 11. Again, while emissions and climate changed over this period, much of the difference between the bad air in 1999 and the better air in 2004 was likely due to the weather – a cooler and more wet summer in 2004 and a hotter and drier summer in 1999. The point here is to not read too much into trends that vary from day to day, month to month, or even year to year.

Looking over a longer time period though, say for the last three decades, a different and more clear picture emerges. Due to the significant efforts to control emissions from tailpipes, smokestacks and other sources, and despite forces pushing the other way like growth in population, vehicle miles of travel, and electric power production, air quality *is* better today than it was a few years ago. Total emissions in the metro Atlanta area are less in 2007 than they were in 1997, and 1997 emissions were less than they were in 1987. We are moving in the right direction with the factors that we can control. The 30 days of unhealthy air in 2006, however, shows that our work is not done.

Q: Do you think we'll ever see another summer like 1999, with 69 “bad air” days?

A: I think we will see a hot and dry summer like 1999. I don't know when, and it remains to be seen how many exceedances we experience when that occurs. The real question is: will we be ready?

Q: Are the current air quality standards good enough to protect public health?

A: With each passing year, health researchers find more associations between poor air quality and negative health effects at lower pollutant concentrations. As a result, air quality standards are being tightened. In 1997, the federal clean air standard for ozone pollution was lowered from an allowable concentration of 125 parts per billion to 85 parts per billion. In 2006, the US EPA lowered one of the standards for particle pollution from an allowable of 65 micrograms per cubic meter to 35 micrograms per cubic meter. As we continue to improve our ability to measure air pollution and its

effects on human health, this trend towards tighter air quality standards is likely to continue.

Q: Do you think metro Atlanta is going in the right direction to improve air quality?

Over the last three decades, the Atlanta area has moved in the right direction. It has not been steady progress though. For every two steps forward, we seem to take one-and-a-half steps back. We drive cleaner cars, but there are more of us driving more miles. We've cleaned up many old industries, but added many new ones. And we have continued to sprawl even as we have rediscovered and redeveloped the *intown* areas. Looking back over the last 30 years, we've made some huge advances. It was hard work. Looking forward over the next 30 years and anticipating the growth that is expected, we will need to continue to work hard just to sustain our progress, and work even harder to make further advances.