December 9, 2003
Climate Scientists Zoom In on Changes
By KIRK JOHNSON

The New York City region has been likened to a quilt - a stitched together patchwork of neighborhoods and communities so different in their economic and ethnic profiles that location can sometimes seem like the only thing they have in common.

Now, for the first time, scientists are beginning to look at the future climate in the same way. Their key insight is that just like everything else in and around New York - from the quality of the schools to crime rates and taxes - global warming and climate change over the coming century will affect people and their health differently depending on where they live.

To test this theory, the New York Climate and Health Project, which scientists say is distinctive in its attention to the smaller-scale impact of global warming, has divided the 31-county region, which includes much of Connecticut, New Jersey and the nearby New York suburbs as well as the city itself, into hundreds of grid boxes, each four kilometers square.

Vast number-crunching climate models, fed with everything now known about those communities and what might be projected in the future, are being asked to speculate what a warming planet might mean, on the ground in each square, to a person on a hot summer's day in the mid-2050's. It is climate science with a zoom lens. Members of the team are presenting their case this week to fellow scientists at a meeting of the American Geophysical Union in San Francisco.

"Before, everything in New York was all in one big box," said Dr. Cynthia Rosenzweig, a research scholar at Columbia University's Earth Institute and one of the leaders of the multidisciplinary climate-study group. "We're now getting the first fine-scale climate-change scenarios."

The implications of that shift in perspective go much further than scientific curiosity.

Meteorologists have long known, for example, that cities can trap radiant energy and compound the complications, costs and miseries of summer – the so-called heat-island effect. The climate project is beginning to reveal where the local heat sources are that drive that process. The New York region's heat island, it turns out, is really an archipelago of industrial areas like Paterson, Camden and the Ironbound section of Newark in New Jersey, and Long Island City in Queens. These places can trap and radiate the sun's effects.

The future of smog is also not perhaps what some people might expect. Most of the climate projections show, for instance, that the air quality across much of the New York City suburban belt is likely to deteriorate more over the coming century than in the city itself. Other parts of the country, meanwhile - notably the Midwest and Southeast - are likely to see their air pollution problems worsen even more than in the Northeast as a whole, the projections say.

But like almost everything else in the complex and controversial subject of climate change, which most scientists say is caused by the burning of fossil fuels, there are some big potential political implications of the New York climate project as well.

Environmentalists say the conclusions so far are reinforcing the argument that local action can make at least a partial difference in a warming climate, through the adoption of things like living green roofs and urban tree belts that can absorb heat and reduce storm water runoff. At the same time, the scientists are exposing as perhaps never before the issues of social justice that environmentalists and social critics say will only become bigger and bigger over time - specifically whether the poor will suffer more under a hotter climate than the rich.

The photochemical stew of smog, for example, is produced when heat, sunlight and pollution interact in the air. Smog, in turn, can aggravate respiratory problems like asthma, which is endemic in many urban lower-income neighborhoods. To complete the cycle, many of the hottest urban neighborhoods in the region - notably older industrial areas like western Queens and Brooklyn that have few open spaces or parks - are also home to many of the city's electricity plants that power the air-conditioners that cool the city.

"You could have a negative spiral - the more you try to cool an area, the more pollution you produce, the more that pollution gets cooked, the more ozone you have," said Edward J. Linky, a senior energy adviser at the federal Environmental Protection Agency's New York office.

But researchers say that the connections being revealed by local climate study might work the other way, too. Engineers in other cities around the world, notably in Japan and Germany, have been working on local heat-reduction technologies for years, and that base of experience, if applied in New York and merged with the fine-resolution climate projections, could create a powerful tool, they say, to make some New York neighborhoods cooler.

Alternatively, scientists say the project might ultimately conclude that local efforts on the ground won't help all that much - a finding that they say would bolster arguments that global warming can be addressed only by large-scale government action.

"This work will help us see the likely impacts of the things we might control," said Patrick L. Kinney, an associate professor at Columbia's Mailman School of Public Health and a principal investigator for the climate and health project.

Sometime next year, an example of that new climate focus will unfold on top of an old manufacturing building in Queens, just under the 59th Street Bridge, when a group of designers and environmentalists installs what its leaders say will be New York City's biggest scientifically designed and monitored living green roof.

A green roof is not at all the same as a garden. One is for pleasure, the other for utilitarian climate duty. The $300,000 Queens project - half paid for by the New York State Energy Research Development Authority, half through privately raised money - will feature hardy,

drought-resistant grasses. A monitoring system will allow researchers to calculate the impact on temperature and water runoff.

The goal, the project's leaders say, is to create a template that can be duplicated over and over, and perhaps even foster a new industry. Long Island City is one of New York City's last industrial strongholds - a weakness, perhaps, in retaining heat, but a potential source of jobs if heat-reduction equipment could be manufactured there.

Long Island City alone, they say, has nearly enough flat roof space to build the equivalent of Brooklyn's Prospect Park - a huge heat-absorbing sponge of roughly 500 acres, all at roof height - if the idea takes off.

Other researchers are focusing on the question of energy use - a chronic concern in the region. This fall, the federal E.P.A.'s New York office commissioned what officials say will be the first computer model in the nation aimed at assessing energy use in one city under different future climates. The model will be able to sort out the various technologies, including tactically placed vegetation, cooler roofs and reflective road surfaces, then calculate the energy consumption effects and costs. One of the first places the model will be focused, E.P.A. officials say, is Lower Manhattan, where electricity use will change significantly over the next few years as the World Trade Center site is redeveloped.

But climate scientists are also hoping that green roofs - and the presumably bolstered argument on their behalf from the climate and health project - will become a kind of ecological fashion statement. The Long Island City building was chosen earlier this year, partly because its owner, Donald Gratz, was enthusiastic, but also because it will be highly visible from the well-traveled 59th Street Bridge between Queens and Manhattan. Mr. Gratz, 68, died of cancer in November, but his widow, Roberta Brandes Gratz, said the family had vowed to continue the project as a tribute to him.

"It represents all the values he stood for, and I really believe it will make a difference," she said.

Green fashion might get an even more visible statement not far away at Silvercup Studios in Long Island City, where the "The Sopranos" and "Sex and the City" are filmed. Studio officials say they are considering going green for all or part of its 120,000 square feet of flat-roofed studio space, partly on the basis of a presentation earlier this year by environmentalists involved in the Gratz project. Silvercup's president, Stuart Match Suna, said he was interested in making an environmental contribution. But he said he was also thinking, at least at little, about the studio's image.

"It could look pretty cool," he said.