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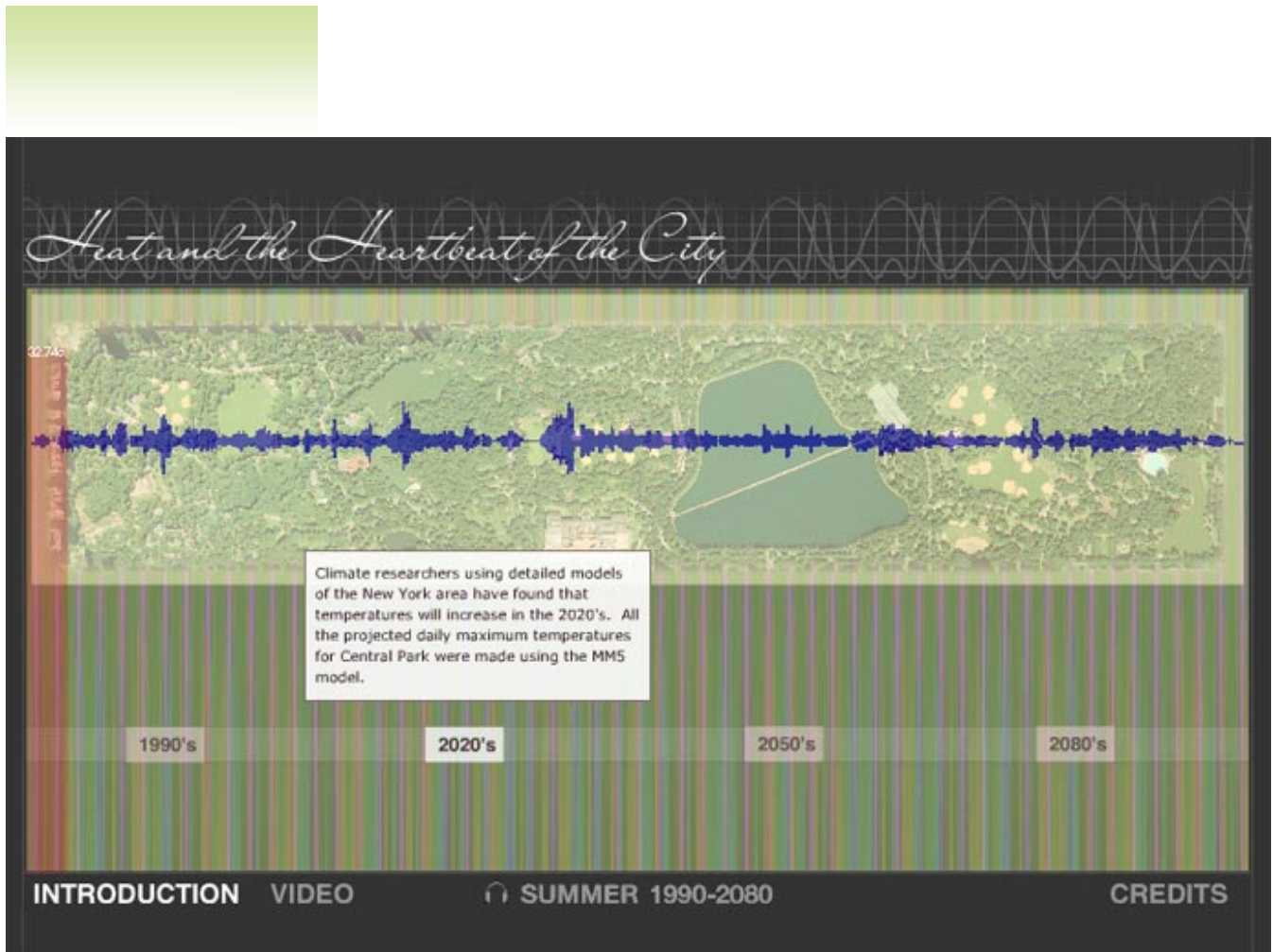


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Heat and the Heartbeat of the City  
 Central Park Climate Change in Sound

*Andrea Polli*

According to a 1999 report published by the Environmental Defense Fund, New York City will be dramatically impacted by global warming in the near future. Average temperatures in New York could increase by one to four degrees fahrenheit by 2030, and up to ten degrees by 2100. According to the Metropolitan East Coast Assessment, the impacts of these changes on this major metropolitan area will be great.

*Heat and the Heartbeat of the City* (launched on [turbulence.org](http://turbulence.org) Dec. 1, 2004) is a web site that presents a series of sonifications (musical compositions created by directly translating data to sound) that illustrate these dramatic changes focusing on the heart of New York City and one of the city's first locations for climate monitoring, Central Park. As you listen to the compositions, you will travel forward in time at an accelerated pace and

experience an intensification of heat in sound.

The data sonified is actual data from summers in the 1990's and projected data for the summers of New York in the 2020's, 50's, and 80's using an atmospheric model of the city that is one of the most detailed models of any urban area. All the data was formatted especially for the creation of sonifications.

The Heat and the Heartbeat of the City site also includes excerpts from interviews with scientific collaborator Cynthia Rosenzweig of the NASA Goddard Institute for Space Studies and Columbia University, and with artistic collaborator Andrea Polli of Hunter College. Dr. Rosenzweig speaks of her research on the causes and effects of warming trends on urban areas:

"In urban areas, climate change effects will be integrated across all the different sectors and groups of people. Mostly when climate change effects have been studied before, they have been studies sector by sector in a very isolated way. So, for example the effects on agriculture, the effects of climate change on world food supply has been studies separately from the effects on water resources and both of those had been separated from the effects on forests. In the city, we don't have the luxury of looking at the sectors individually because we're all so close together and everything is happening simultaneously, we have to look at our sectors, the impacts on our sectors, in an integrated way."

In the summers, warming trends will impact human life. Dr Rosenzweig explains:

"...one very important sector that we looked at is human health. To the 21 1/2 million people here in the city, clearly health is a big issue. There are two main effects that climate change will have on health. One is heat stress... especially for elderly people and the very young because their physiological systems aren't as good at maintaining the proper body temperature, but it's also an issue for the lower socio-economic groups who don't have as much access to air conditioning... The other main health effects are the health effects related to air pollution because higher temperatures increase the number of ozone days that we have because the chemical reaction to create ozone is catalyzed by warmer temperatures. When there is more ozone there are more visits to hospitals related to asthma."

In particular, the Heat and the Heartbeat of the City sonifications focused on expressing the effect of consecutive days over 90 degrees Fahrenheit during the summer months. If the number of consecutive days averaging over 90 degrees increase, this will increase the intensity of the sound. Andrea Polli states goals for these sonifications in the online interview:

"What I have been trying to do is to develop a sonification that somehow expresses the dramatic difference...in particular to emphasize the days over 90 degrees fahrenheit, an uncomfortable day. I've been trying to create an uncomfortable kind of a sound. I think that sound is a very visceral thing and I think that if people can really feel the potential difficulties, the potential discomfort, but more than just uncomfortable, actual problems that will result from global warming, maybe in some way they will be convinced to think more seriously about the issue."

As a scientist collaborating with an artist, Dr. Rosenzweig is interested in how people can experience data in new ways. She states:

"...we are so limited in the ways that we use our data. Basically we have a number of ways that are very statistical, certainly very mathematical and very useful, and then we represent the results of those statistics

in graphs and tables. That's one way, and then we do have visualizations, for example an animation of how the warming, using colors from yellow to red to deep brown over the decades. But that's it, it's really quite limited. So working on the sonification project you realize that when you hear something, you're able to understand the data in a new way, and that's what [has] been very fascinating."

In addition to the web site, the project has been presented as a multi-channel sound installation presenting climate change throughout the NYC region in the summers from 1990-2060 and a stereo headphone or speaker installation. Collaborators in addition to Andre Polli and Cynthia Rosenzweig were: David Rind, and Richard Goldberg, NASA Goddard Institute for Space Studies and Columbia University, and filmmaker Morgan Barnard.

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*Andrea Polli* is a digital media artist living in New York City. She is currently an Associate Professor of Film and Media at Hunter College. Polli's work addresses issues related to science and technology in contemporary society. She has presented work nationally and internationally and is currently working in collaboration with a number of scientists to develop systems for understanding storms and climate through sound. For this work, she has been recognized by the UNESCO Digital Arts Award 2003 and has presented work in the 2004 Ogaki Biennale in Gifu, Japan and at the World Summit on the Information Society in Geneva, Switzerland.

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