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Global warming increase predicted

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The National Center for Atmospheric Research released the newest model of Earth's climate Wednesday — a massive computer simulation showing that global temperatures may rise "significantly more" than early models have predicted.

Predictions for increased warming from a doubling of carbon dioxide levels next century may not sound like much — 4.7 degrees instead of 3.6 degrees — but researchers say the difference could have a powerful effect on international and domestic policy in the next few years.

The new Community Climate System Model, version 3, climatologists' equivalent of a new Windows operating system, was created by four supercomputing centers in the United States and Japan. It will calculate the effects of climate changes and guide policy on everything from melting polar ice caps, rising sea levels, expanding deserts and shifting agricultural patterns.

Even with the 20 trillion bytes of data the model has generated — the equivalent of the contents of the Library of Congress — it can still only predict broad trends in climate, not short-term or local changes. And even broad trends will take years to mine from the still-growing mass of data.

"This model makes substantial improvements in simulating atmospheric, oceanic and terrestrial processes," says William Collins, who oversaw its development. "We're now ready to begin using it to study the climate of the next century."

The National Center for Atmospheric Research in Boulder, Colo., the Oak Ridge National Laboratory in Tennessee, the Lawrence Berkeley National Laboratory in California and Japan's Earth Simulator in Yokohama collaborated to build and run the massive simulation.

Because a single day of simulated climate requires about 3 trillion computer calculations, the project has already consumed more than 7.5 million hours — nearly 1,000 years — of concurrent computer processor time. Scientists don't expect to finish running the major climate scenarios through the end of the 21st century for several more months.

The release of the model into the public domain on Wednesday will make it instantly available to scientists throughout the world to use in predicting specific changes and regional effects of the global warming trend.

The model simulates the interaction of clouds, ocean currents, sea ice, deforestation and a host of other forces, including one of the overriding influences on climate over the past century — the steady rise of carbon dioxide in the atmosphere. Carbon dioxide has risen by more than 30 percent and there is no sign the trend is slowing.

And despite the sophistication of the new model, work has already begun on its successor — one that will make it possible to resolve the effects of changing climate at a state and local level.

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