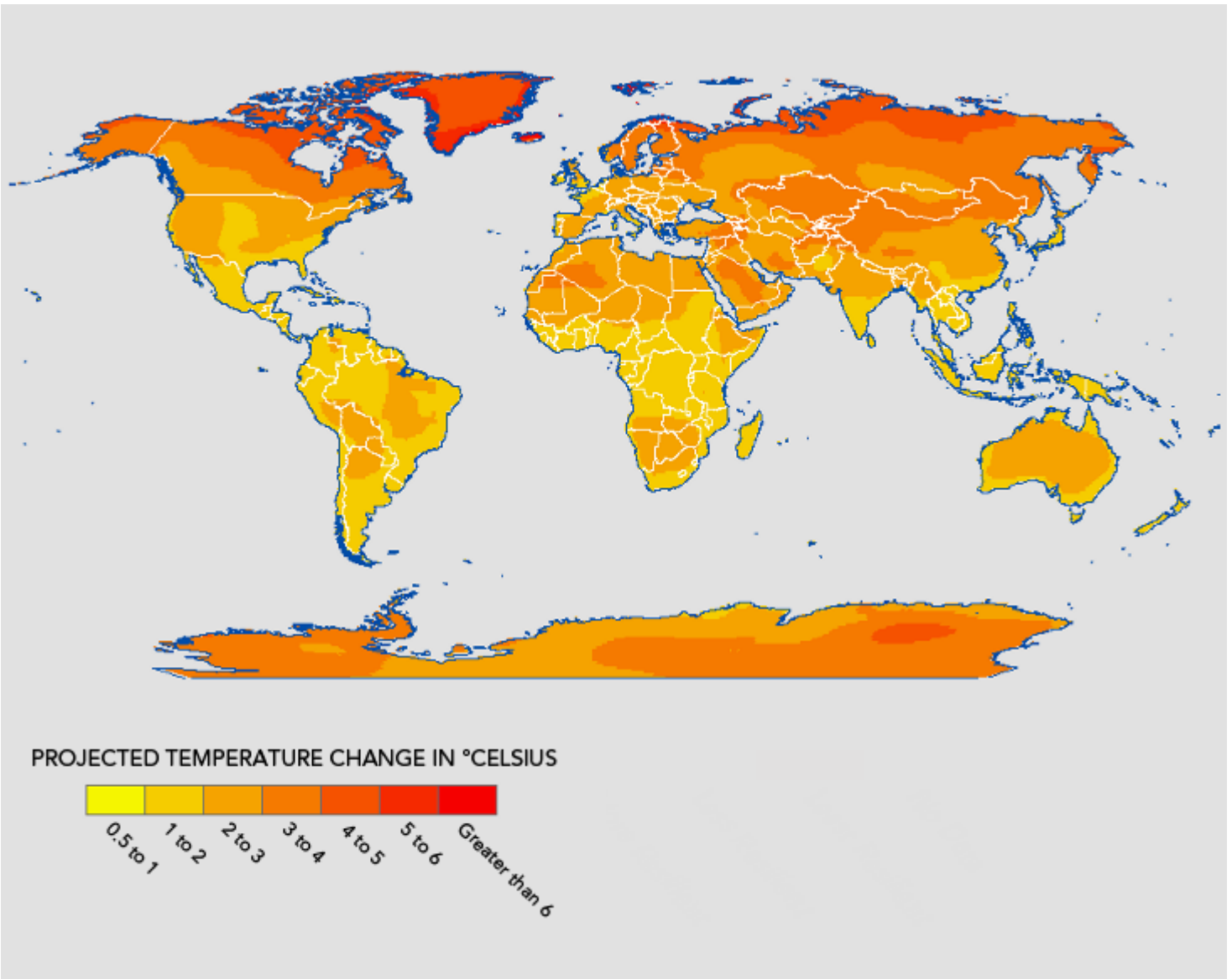


Projected temperature change

1990 to 2090



Projected temperature change

1990 to 2090

DESCRIPTION

Under the projected climate scenario used for these maps, which assumes moderate levels of population and economic growth and relatively little globalization, temperature would continue to rise globally as the 21st century progresses. Nearly all land areas would experience an increase of at least 1 to 2 degrees Celsius (1.8 to 3.6 degrees Fahrenheit) between the end of the 20th and 21st centuries. The increase would be more pronounced, in the range of 2 to 3 degrees Celsius (3.6 to 5.4 degrees Fahrenheit) in much of the United States, northern Africa, Europe and India. Temperatures would rise even higher in northern China and much of Russia, reaching a projected increase of 5 to 6 degrees Celsius (9 to 10.8 degrees Fahrenheit) at the northernmost latitudes of Canada and Russia. The higher temperatures and other changes in climate may lead to losses in tropical forest, species extinction, and higher mortality due to heat waves.

DEFINITIONS

The datasets used for this map are gridded into points, each measuring 2.8 by 2.8 degrees of longitude and latitude, and include one set of historic data and one of projected data. Both datasets provide one temperature reading in degrees Kelvin for each point for each month of every year. The historic data, which cover the period from 1890 to 1999, are based on both actual observations and model-driven interpolations. The projected dataset provides readings for 2000 to 2099. The 12 monthly readings for each year were averaged to produce an annual reading. In order to smooth outliers and better represent gradual trends over time, each of the three years mapped in the dataset represents a 20-year average surrounding that year. For example, data provided for 1990 are in fact an average of annual temperature data for each year between 1980 and 1999; the same applies to 2035 and 2090 projections. After all data had been averaged to these specifications, the units were converted from degrees Kelvin to degrees Celsius.

SOURCES

Indicators of baseline and future changes in temperature, precipitation and soil moisture are derived from the output of the B2 scenario of the Parallel Climate Model (PCM), through the help of scientists at the National Center for Atmospheric Research (NCAR). The B2 scenario was chosen because it assumes a medium level of future population growth based on the United Nations Population Division's long-range projections.

The Parallel Climate Model is sponsored by the U.S. Department of Energy (DOE), and is a joint effort between Los Alamos National Laboratory (LANL), the Naval Postgraduate School (NPG), the U.S. Army Corps of Engineers' Cold Region Research and Engineering Lab (CRREL) and the National Center for Atmospheric Research (NCAR). The PCM and the Community Climate System Model (CCSM), both developed at NCAR, are fully-coupled, global climate models that provide state-of-the-art simulations of the Earth's past, present and future climate states. These coupled general circulation

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models (GCM) consist of sub-models of the atmosphere, ocean, sea-ice and land linked by a central flux coupler.

The data used in PAI's analysis are from the PCM1, contributed to the IPCC Third Assessment Report. We chose this set of data, although it is not among the most recent model outputs from the IPCC Fourth Assessment Report, because PAI's project maps the changes in the "medium" scenario of population, which is embedded in B2 scenario, and almost all major climate model outputs contributing to the IPCC Fourth Assessment Report do not contain a B2 scenario. Scientists and modelers consulted at NCAR confirmed that the climate projection results for the Third and Fourth Assessment are quite consistent, and differences between the two are rather small. For more information on the model, see: Washington, W M, J W Weatherly, G A Meehl, A J Semtner, Jr., T W Bettge, A P Craig, W G Strand, Jr., J M Arblaster, V B Wayland, R James and Y Zhang. 2000. "Parallel climate model (PCM) control and transient simulations." *Climate Dynamics* 16(10/11): 755-774.

Impacts of climate change are described in *Climate Change 2007: A Synthesis Report*, adopted by the Intergovernmental Panel on Climate Change (IPCC) in November 2007.