Climate zones used by the Los Angeles Department of Water and Power, based on summer average daily temperatures, and reflecting microclimates in the City of Los Angeles

A team led by UCLA researcher Dr. Alex Hall has released a study that projects temperature trends by neighborhood within the Los Angeles region for the mid-21st century. The report is the most sophisticated regional study of climate trends that has ever been developed, and is based on climate modeling two orders of magnitude higher in resolution than previous models. The research was supported by the City of Los Angeles and the U.S. Department of Energy through ARRA "stimulus" funding, in partnership with the Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC), based at UCLA in the UCLA Institute of the Environment and Sustainability.

The take-home point: It will get hotter and hotter in Los Angeles in the coming decades, and the worst change is projected for inland valleys and desert areas.

Dr. Hall, of the UCLA Department of Atmospheric and Oceanic Sciences, and his team projected temperature profiles for the period 2041-2060 (30 to 50 years from now) for two greenhouse gas emissions scenarios: first, GHG concentration of approximately 1200 ppm CO_2 equivalent (which
is projected to be the highest estimate among current policy options); and second, GHG concentration of approximately 460 ppm CO_2 equivalent (framed in the study as at the lowest estimate within the current range of policy options).

Dr. Hall used "dynamical downscaling" of the climate — intense computation to model physical climate processes at a high resolution, including specific climate attributes within microclimates in the Los Angeles region — and applied the results of the downscaling to 19 different global climate models. This resulted in a model that predicts, within a range of uncertainty, the future of the Los Angeles climate down to blocks only 2 km in diameter, compared to the 200km resolution of past models.

Some background might be helpful: In the Los Angeles region, we have microclimates that result in large temperature differentials from neighborhood to neighborhood, because of our unique topography with mountains and ocean nearby. As a result, temperatures at the beach in Santa Monica can be as much as 25 degrees cooler than temperatures in the

western San Fernando Valley just a few miles away. Thus, this type of modeling is particularly valuable and interesting here in Los Angeles, as this information is essential to help our public officials, businesses, and residents to plan for climate change's impacts.

The results of this study are sobering: we can expect several degrees of warming in all our neighborhoods. Unsurprisingly, the areas that are already the hottest — inland valleys and deserts, for example — are projected to have the most "extremely hot" days (over 95 degrees Fahrenheit), and to have the largest increase in the number of such days. And most of the warming will happen in the summer and fall; our springs and winters will not warm as much compared to the hotter months. In communities such as Woodland Hills in the west San Fernando Valley, Lancaster in the Antelope Valley, and Riverside, the already-hot summer months will become dramatically hotter.

And even under the more optimistic GHG reduction scenario, reflecting aggressive action to reduce GHG emissions that will still result in GHG concentrations substantially higher than those in the atmosphere today, the study projects that 70% of the projected warming will still occur. (Looking at this another way, we can still avoid 30% of the warming by taking aggressive action.)

The City of Los Angeles and other communities will be using the results of this analysis in their climate change adaptation efforts over the coming years. This type of information is also useful in communicating the impact of climate change to people who are understandably less concerned with abstract or faraway impacts than they are with effects that are tangible and close to home.

This groundbreaking work will continue, as Dr. Hall's team will model the projected regional changes in other climatic features besides temperature rise. Congratulations to Alex Hall, as well as to Dr. Paul Bunje of LARC, for their work on this important project. And kudos to the leadership of Mayor Antonio Villaraigosa (and Beth Jines of his staff, who has managed this project for the City, as well as Deputy Mayor Romel Pascual) on this issue. Finally, kudos to Climate Resolve and its executive director J0nathan Parfrey, who developed the communications plan and media release to ensure that this important work is well-understood and gets into the hands of decisionmakers and the public.