

# EXTREME TEMPERATURES IN ASIA

*Have there been more frequent hot weather events during the past century?*



SPPI & CO2SCIENCE ORIGINAL PAPER



July 4, 2012

# EXTREME TEMPERATURES IN ASIA

**Citation:** Center for the Study of Carbon Dioxide and Global Change. "Extreme Temperatures in Asia." Last modified July 4, 2012. <http://www.co2science.org/subject/e/summaries/extremeasia.php>.

One of the projected negative consequences of global warming is a concomitant increase in climatic variability, including more frequent hot weather events. It is a relatively easy matter to either substantiate or refute such claims by examining trends of extreme temperatures over the past century or so; because if global warming has truly been occurring at an unprecedented rate over the past hundred years, as climate alarmists claim it has, temperature variability and extreme temperature events should be increasing, according to them. Therefore, this review investigates this issue as it pertains to locations in Asia.

Many long tree-ring series obtained from widely-spaced Himalayan cedar trees were used by [Yadav et al. \(2004\)](#)<sup>1</sup> to develop a temperature history of the western Himalayas for the period AD 1226-2000; and "since the 16th century," to use their words, "the reconstructed temperature shows higher variability as compared to the earlier part of the series (AD 1226-1500), reflecting unstable climate during the Little Ice Age (LIA)." With respect to this greater variability of climate during colder conditions, they note that similar results have been obtained from juniper tree-ring chronologies from central Tibet (Braeuning, 2001), and that "historical records on the frequency of droughts, dust storms and floods in China also show that the climate during the LIA was highly unstable (Zhang and Crowley, 1989)." Likewise, in a study of the winter half-year temperatures of a large part of China, Ge et al. (2003) identified greater temperature anomalies during the 1600s than in the 1980s and 90s. And an even greater extreme anomaly occurred in China in the summer of 1743, as reported by [Zhang and Gaston \(2004\)](#)<sup>2</sup>.

*It was the hottest period of the hottest summer experienced in north China over the past seven centuries, where peak warmth exceeded the modern-day extreme heat wave high temperature by fully 2°C. What is more, it occurred in 1743, as opposed to occurring during the modern era of instrumentality.*

This impressive 18th century "heat wave attack" was felt throughout northern China, including Beijing, Tianjin and the provinces of Hebei, Xhanxi and Shandong. One report from Tianjin at the time said that "July's heat is insupportable; fields full of cracks; rocks scorched; melting metal on mast top; many died of heat." In Gaoyi the temperature was said to be "as hot as fire in rooms and under heavy shades of trees, with melting lead and tin at midday and many died of thirst on 19-26 July." Other

<sup>1</sup> <http://www.co2science.org/articles/V7/N39/C2.php>.

<sup>2</sup> <http://www.co2science.org/articles/V8/N23/EDIT.php>.



reports of people dying from the intense heat were received from Shenze, Changzhi, Fushan, Gaoqing and Pingyuan, with the communication from Shenze saying "the disaster is indeed unprecedented." In fact, from the 14th to the 25th of July, it was reported that 11,400 people died from the heat in Beijing and its suburbs. This number, however, was a vast *underestimate* of the real death toll, for it included only "poor people, like craftsmen, or workers," neglecting the deaths of "the well-off and the ones in service," of which it was said "there were a large number." And that was just in Beijing.

But just how unusual was this deadly heat wave? According to Zhang and Gaston (2004), it was the hottest period of the hottest summer experienced in north China over the past seven centuries, where peak warmth exceeded the modern-day extreme heat wave high temperature by fully 2°C. What is more, it occurred in 1743, sandwiched between two of the coldest intervals of the Little Ice Age, as opposed to occurring during the modern era of instrumentality.

Focusing in on this latter interval of time (the era of modern instrumentality), [Zhai and Pan \(2003\)](#)<sup>3</sup> derived trends in the frequencies of warm days and nights, cool days and nights, and hot days and frost days for the whole of China over the period 1951-1999, based on daily surface air temperature data obtained from approximately 200 weather observation stations scattered across the country. Over the period of study, and especially throughout the 1980s and 90s, the authors found increases in the numbers of warm days and nights, while there were decreases in the numbers of cool days and nights, consistent with an overall increase in mean daily temperature. At the extreme *hot* end of the temperature spectrum, however, the authors report that "the number of days with daily maximum temperature above 35°C showed a

*During the second half of the 20th century there was a reduction in extreme cold weather events in China without any concomitant increase in extreme hot weather.*

slightly decreasing trend for China as a whole," while at the extreme *cold* end of the spectrum, the number of frost days with daily minimum temperature below 0°C declined at the remarkable rate of 2.4 days per decade. To put it another way, during the second half of the 20th century there was a reduction in extreme cold weather events in China without any concomitant increase in extreme hot weather.

Finally, and also working in China, [Zhou and Ren \(2011\)](#)<sup>4</sup> evaluated trends in 15 different extreme temperature indices for the period 1961-2008 using daily temperature records from 526 measurement stations included among the China Homogenized Historical Temperature Datasets compiled by the National Meteorological Information Center of the China Meteorological Administration; and based on the earlier findings of Zhou and Ren (2009) - which indicated that the contribution of urban warming to overall warming often exceeded

<sup>3</sup> <http://www.co2science.org/articles/V6/N42/C1.php>.

<sup>4</sup> <http://www.co2science.org/articles/V15/N12/C1.php>.

50% - they adjusted their results to account for the impact of each site's urban heat island effect.

In doing so, Zhou and Ren discovered that "urbanization intensified the downward trend in cold index series and the upward trend in warm indices related to minimum temperature." More specifically, they report that "the urbanization effect on the series of extreme temperature indices was statistically significant for the downward trends in frost days, daily temperature range, cool nights, and cool days," as well as for "the upward trends in summer days, tropical nights, daily maximum temperature, daily minimum temperature, and warm nights." And for these indices, they say that "the contributions of the urbanization effect to the overall trends ranged from 10 to 100%, with the largest contributions coming from tropical nights, daily temperature range, daily maximum temperature and daily minimum temperature," adding that "the decrease in daily temperature range at the national stations in North China was caused entirely by urbanization." Given such findings, the two researchers concluded their paper by stating that "more attention needs to be given to the issue [of urbanization on temperature] in future studies," which is something that IPCC contributors and reviewers need to look at much more closely in the future than they have in the past.

*More attention needs to be given to the issue of urbanization on temperature in future studies, which is something that IPCC contributors and reviewers need to look at much more closely in the future than they have in the past.*

Given the findings of all the above studies, it appears that for a large portion of Asia, the climate-alarmist claim that extreme temperatures are increasing in response to CO<sub>2</sub>-induced global warming is not supported by observational data.

## REFERENCES

- Braeuning, A. 2001. Climate history of Tibetan Plateau during the last 1000 years derived from a network of juniper chronologies. *Dendrochronologia* **19**: 127-137.
- Ge, Q., Fang, X. and Zheng, J. 2003. Quasi-periodicity of temperature changes on the millennial scale. *Progress in Natural Science* **13**: 601-606.
- Yadav, R.R., Park, W.K., Singh, J. and Dubey, B. 2004. Do the western Himalayas defy global warming? *Geophysical Research Letters* **31**: 10.1029/2004GL020201.
- Zhai, P. and Pan, X. 2003. Trends in temperature extremes during 1951-1999 in China. *Geophysical Research Letters* **30**: 10.1029/2003GL018004.

Zhang, D. 2000. *A Compendium of Chinese Meteorological Records of the Last 3000 Years*. Jiangsu Education Press, Nanjing, pp. 2340-2366.

Zhang, D. and Gaston, D. 2004. Northern China maximum temperature in the summer of 1743: A historical event of burning summer in a relatively warm climate background. *Chinese Science Bulletin* **49**: 2508-2514.

Zhang, J. and Crowley, T.J. 1989. Historical climate records in China and reconstruction of past climates (1470-1970). *Journal of Climate* **2**: 833-849.

Zhou, Y.Q. and Ren, G.Y. 2009. The effect of urbanization on maximum and minimum temperatures and daily temperature range in North China. *Plateau Meteorology* **28**: 1158-1166.

Zhou, Y. Q. and Ren, G.Y. 2011. Change in extreme temperature event frequency over mainland China, 1961-2008. *Climate Research* **50**: 125-139.



*Cover photo of a temple in Yunnan, China  
provided by Fotolia.*

