

# STATISTICAL METHODS FOR RELATING TEMPERATURE EXTREMES TO LARGE-SCALE METEOROLOGICAL PATTERNS

Richard W. Katz

Institute for Mathematics Applied to Geosciences  
National Center for Atmospheric Research  
Boulder, CO

## *Abstract*

In recent years, at least a few papers have made use of statistical methods based on extreme value theory to detect trends in the frequency and intensity of extreme temperature events. For the most part, these papers have not explicitly considered hot spells (or heat waves), events whose structure is more complex. The characterization of such events requires not only their frequency and intensity, but also duration. Furrer et al. (2010) considered how statistical methods based on extreme value theory can be extended to apply to hot spells, including the provision for trends. Using time series of daily maximum temperature for a set of stations in the California Central Valley, I will demonstrate how indices of large-scale meteorological patterns can be incorporated into this same statistical framework for hot spells.

The statistics of temperature extremes are contrasted with those of precipitation extremes, for which clustering at high levels is not nearly as prominent. How statistical methods based on extreme value theory can be used in the statistical downscaling of extremes is also briefly discussed.

## REFERENCE

Furrer, E.M., R.W. Katz, M.D. Walter, and R. Furrer, 2010: Statistical modeling of hot spells and heat waves. *Climate Research*, **43**, 191–205.