The Role of Statisticians in Climate Change Research

Statisticians have played a major role in developing new methods for the analysis, interpretation and graphical display of climatic data from both observational networks and climate models. We have published numerous papers in both statistics and subject-matter journals, and contributed to the reports of Intergovernmental Panel on Climate Change (IPCC) and the U.S. government's Climate Change Science Program (CCSP).

Verifying Climate Change:

- ***Decadal Temperature trends:*** Li et al. found that recent decadal temperature increase is rapidly overwhelming previous maxima, even with uncertainty taken into account, and the last decade is highly likely to be the warmest in the last millennium. This work was an independent re-analysis of the Mann, Bradley and Hughes "hockey stick" data, performed by constructing "ensembles" of past temperature data taking both observational records and proxies into account.
- ***Hurricane intensity:*** Elsner et al. examined data on maximum windspeeds within tropical hurricanes over 1981-2006, and found that the highest intensity hurricanes are becoming more intense. The paper used "quantile regression", a method originally developed by econometricians for finding when trends in the extremes are different from trends in the center of the distribution

Climate Change Projections

- ***Regional warming***: Smith et al. in a study of 22 land-surface regions found that Alaska, Greenland and Northern Asia will warm more than other regions. The methodology included using Bayesian hierarchical models to calculate distributions of projected temperature change.
- ***Temperature Extremes and precipitation intensity:*** Tebaldi et al. verified greater temperature extremes and unequivocal evidence of greater precipitation intensity, and derived future projections of extreme events under different emission scenarios. Their methodology included the statistical analysis of ten indicators of climate extremes, including number of frost days, extreme temperature range, length of growing season, heat wave duration index, percentage of warm nights, and 5 measures of extreme precipitation.

Health Risks Associated with Climate Change

- ***Mortality Risk:*** Anderson et al. quantified the overall increase in heat-related mortality risk for 107 US cities and identified susceptible subpopulations. Such results inform targeted heat-related mortality prevention

Developed by the Climate Change Policy Advisory Committee. For further information, contact the ASA Director of Science Policy, Steve Pierson: 703.302.1841; pierson@amstat.org.