

ATELIER « MÉTHODES STATISTIQUES EN MÉTÉOROLOGIE ET EN CHANGEMENT CLIMATIQUE »
12–14 JANVIER 2011

WORKSHOP ON “STATISTICAL METHODS FOR METEOROLOGY AND CLIMATE CHANGE”
JANUARY 12–14, 2011

Anthropogenic influence on long return period daily temperature and precipitation extremes

Francis Zwiers *
fwzwiers@uvic.ca

There is now a well established approach to detecting and attributing the causes of observed changes in mean climatic conditions that has been applied progressively from global scales to regional scales to temperature, precipitation and other climate variables. While this research has provided a great deal of useful information about the causes of climate change observed during the past century or more, policy makers and others have also been demanding answers about whether there are attributable changes in the frequency and/or intensity of extreme weather and climate events. The statistical techniques required to respond to these questions are only now begin developed. This talk will describe a standard technique that is used in climate change detection and attribution research and will describe a couple of parallel approaches that have been proposed to assess whether there is a detectable human influence in the far tails of the distribution of climate variables such as daily maximum air temperature or daily precipitation amount. We also describe initial applications of these approaches, and discuss limitations and further areas of improvements. These applications suggest that human influence on the climate system has affected the extremes of daily maximum and minimum temperatures, and extreme daily precipitation amounts, altering the waiting times for events of a fixed amplitude. For example, on a global scale, waiting times for extreme annual minimum daily minimum and daily maximum temperatures events that were expected to recur once every 20 years in the 1960s are now estimated to exceed 35 and 30 years respectively. In contrast, waiting times for circa 1960s 20-year extremes of annual maximum daily minimum and daily maximum temperatures are estimated to have decreased to less than 10 and 15 years respectively.

*Pacific Climate Impacts Consortium, University of Victoria, Sedgewick C183, PO Box 1700, Stn CSC, Victoria (BC), V8W 2Y2, Canada.