



Photo: F. Zwiers

# Observational Data and Information

**Francis Zwiers**  
Director, Climate Research Division, Environment Canada  
Acknowledgement: Thomas Peterson, NCDC, NOAA

Environment Canada  
Environnement Canada

ASTD/CRD

## Outline

- What is needed, and why
- Status of GCOS Surface Network
- A complementary approach - the ETCCDI climate indices
- Conclusions


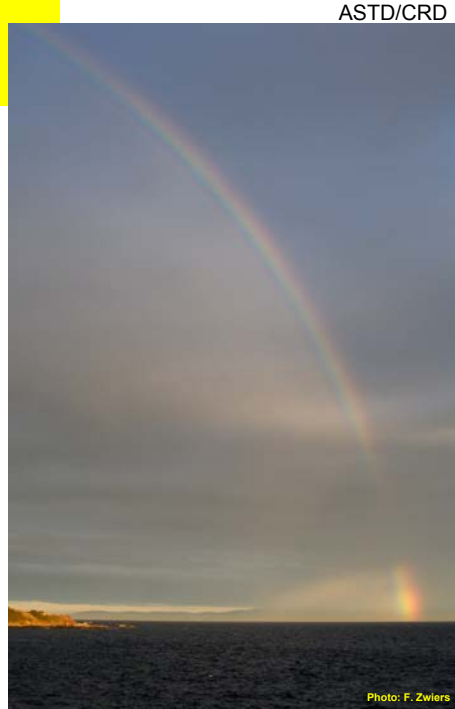


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## Need past and current climate data to ...

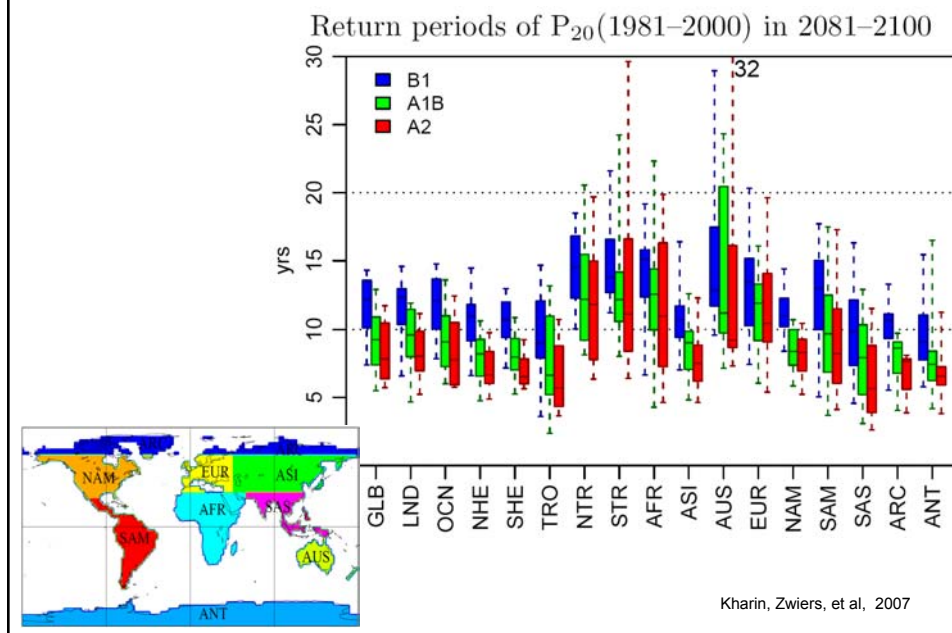
- Document current state of climate system
- Describe how it has changed
- Determine why
- Quantify how much due to anthropogenic and other forcing agents
- Predict how much more to expect



## Daily data in particular are crucial ...

- Impacts will come via extremes
  - ➔ for effective, cost efficient, adaptation to changing extremes ... we need daily data to
    - quantify the current scope of the problem
    - assess models used to project changes
    - determine how much worse in the future
- A projection of how much more often, and/or how much bigger is not very useful if we can't quantify how often, and how big in the current climate

## Projected waiting time for 20-yr 24-hr PCP event



## Data increase in value with use ...

- Probed, questioned, validated, tested, documented, supported by meta data, openly disseminated
- This work of increasing data's value and utility needs to be shared
- Increases confidence in the derived information
- Increases its value and utility for all involved
- True for all types of data

How we increase the prospects for open data and information exchange globally?

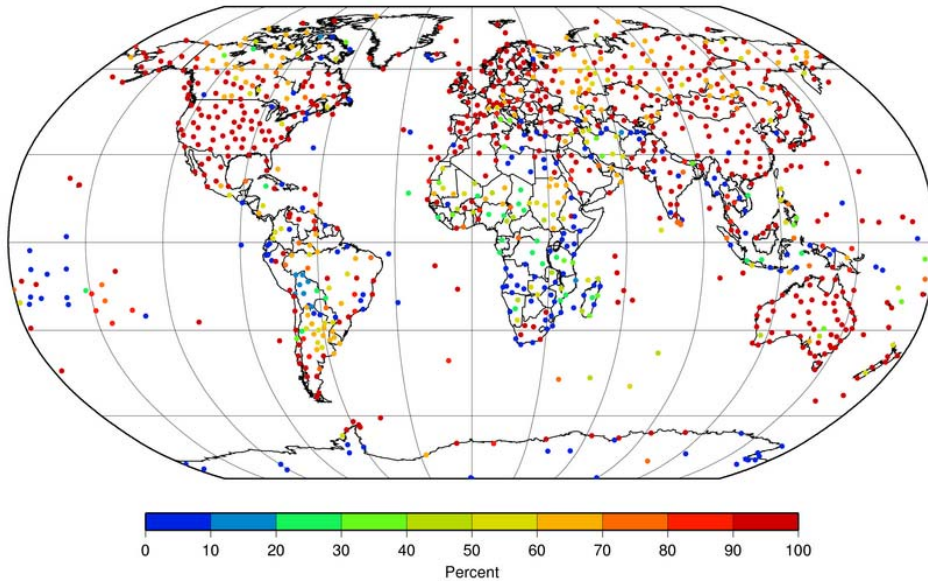
**Should there be a GNU public license for data???**

## GSN CLIMAT Archive



## CLIMAT – not all stations report regularly

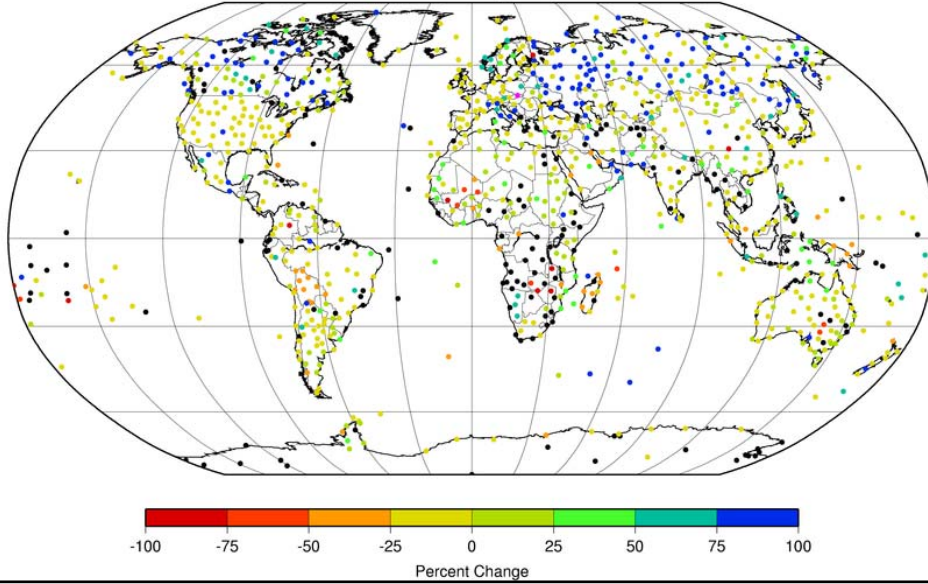
Percent of CLIMAT Reports March 2005 - Feb. 2006



## CLIMAT – many improvements since 2001

GSN Monthly Reports 2006 minus 2001

Magenta = 100% complete both years  
Black = 100% missing both years

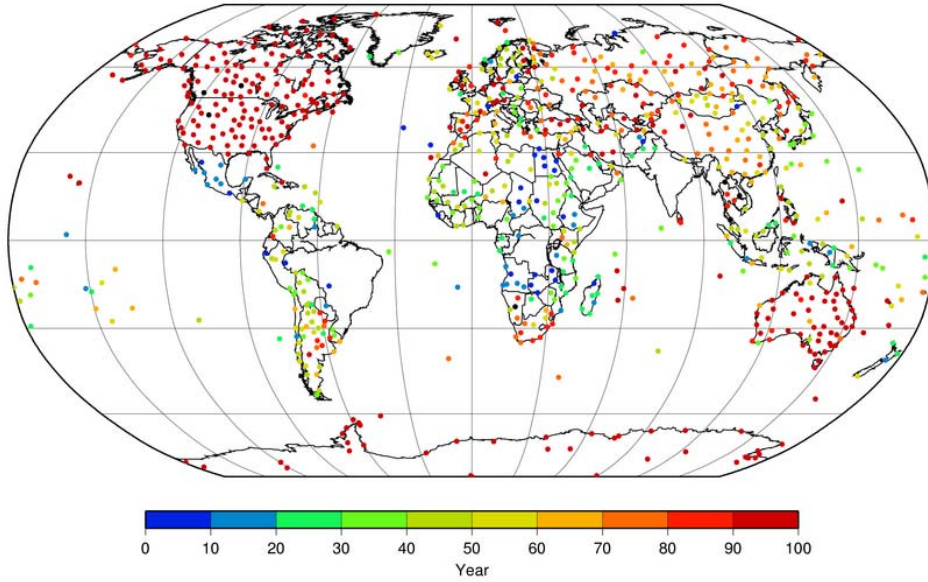


## GSN – Daily Archive

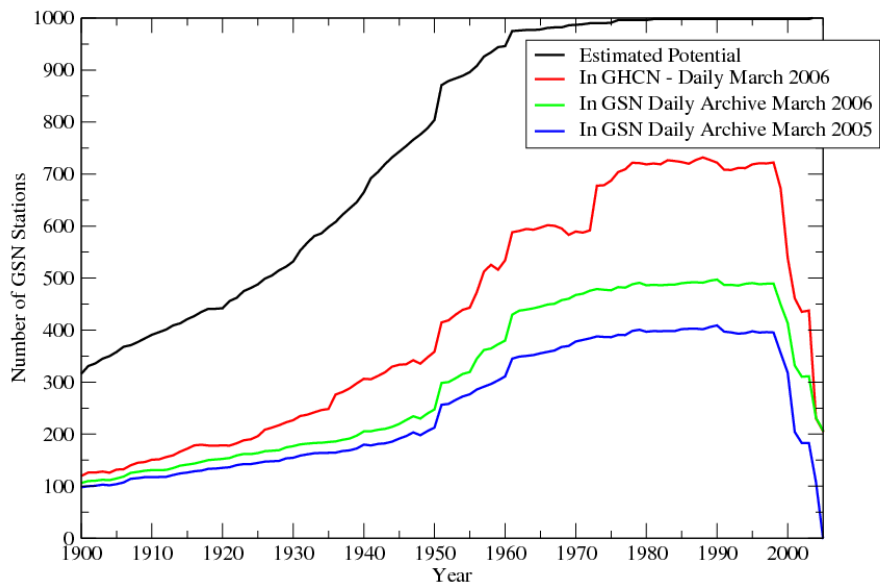


## GHCN Daily data – coverage and completeness

Percent of Potential Daily Data in GHCN Daily



### Daily GSN Data



## State of the GCOS Surface Network

- CLIMAT archive
  - Stable, or gradually improving, but some chronic problems
  - Some stations not sending CLIMAT records do send synoptic and/or hourly records
- Daily archive
  - GSN Archive now provides daily data from all sources via GHCN
  - Updated daily using GTS synoptic data
  - Available from
    - <ftp://ftp.ncdc.noaa.gov/pub/data/ghcn/daily/gsn>
  - Still some “catch-up” work to do to include recently available data
  - Some recent, encouraging, successes
    - New records being added
    - Old records being extended back in time
  - But chronic gaps remain

## A complementary approach – ETCCDI

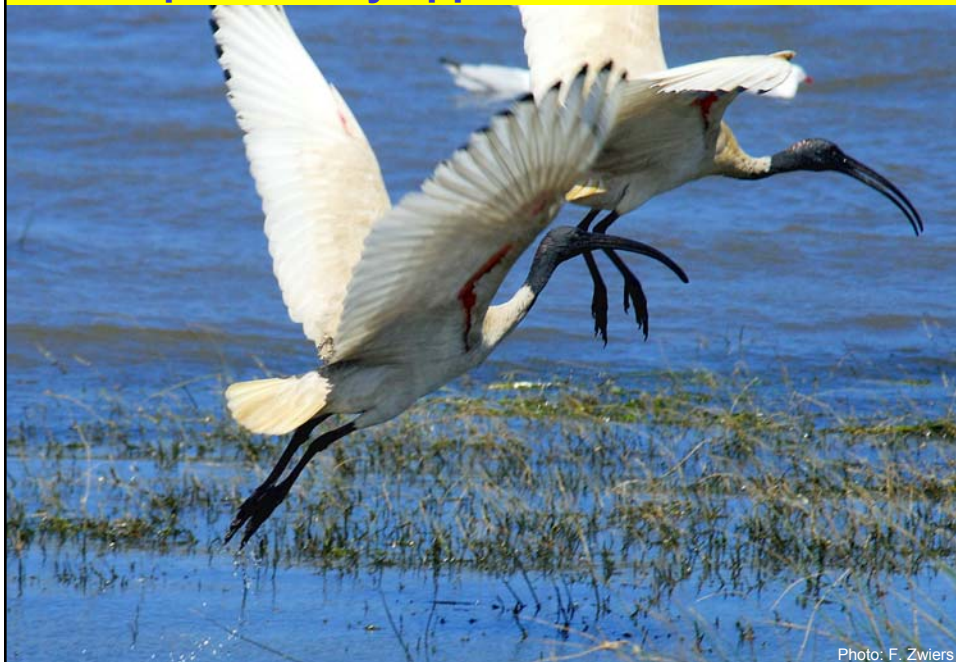
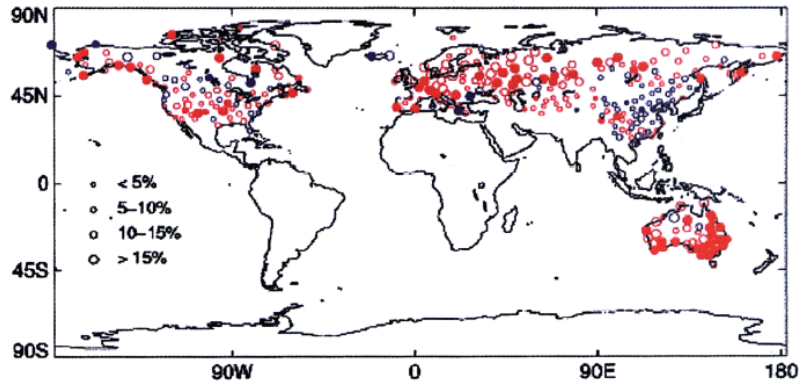


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## CCI/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI)

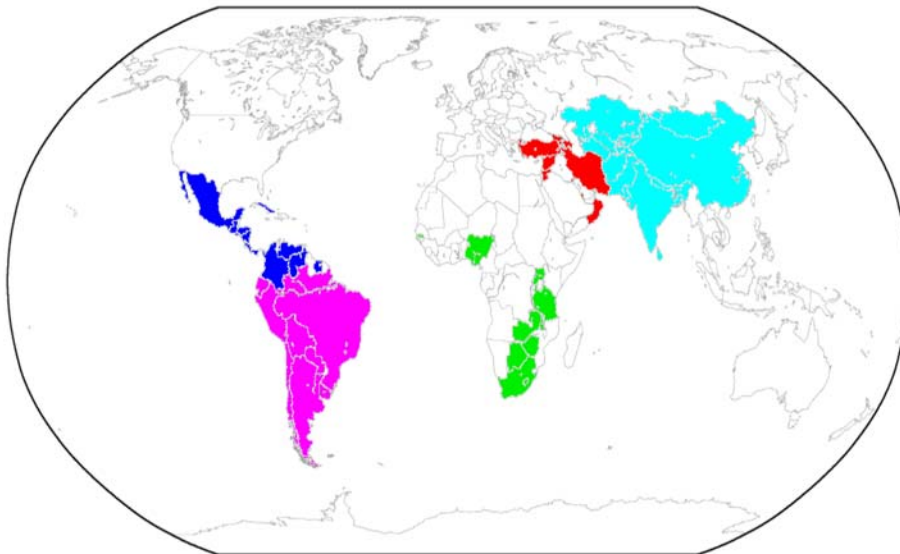
Workshops to fill gaps in this 2002 extremes analysis

Percent of time  $T_{min} > 90^{th}$  percentile (194  $T_{n90}$ )  
Change (%) between two multi-decadal averages during 2<sup>nd</sup> half of 20<sup>th</sup> Century

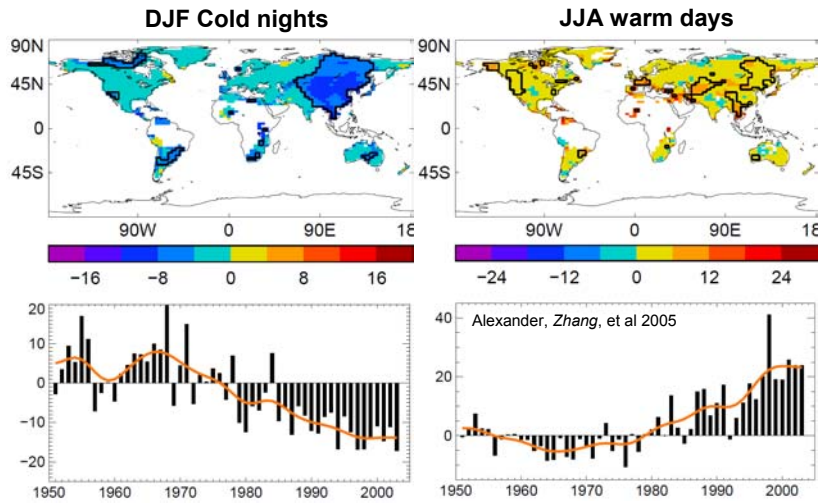


Red is a positive change. Filled circles are significant at 95% level of confidence

## Regional workshops (2002-2005)



## Indices of temperature “extremes”

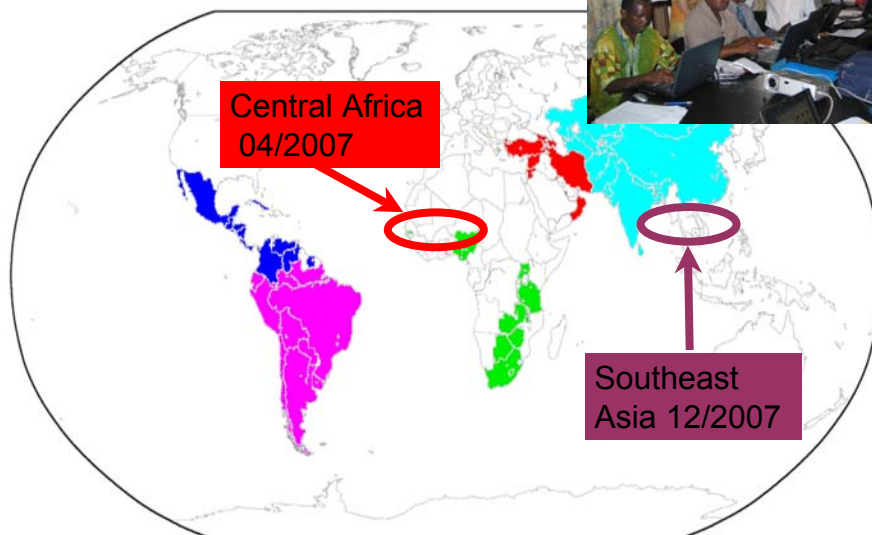


- Anthropogenic influence detected in indices of cold nights, warm nights, and cold days

Christidis, et al 2005

## WMO ETCCDI Workshops






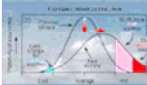
Working together

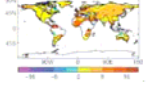


**http://cccma.seos.uvic.ca/ETCCDMI/**

**Guidance**  
**Examples**  
**Software & Documentation**  
**Indices**

**ETCCDI/CRD Climate Change Indices**





**Indices**

[Definition](#)

[Calculation](#)

[Homogeneity](#)

[Example](#)

[Software](#)

[Data](#)

[Workshops](#)

[Home](#)

**Overview**

The joint CCI/CLIVAR/JCOMM Expert Team (ET) on Climate Change Detection and Indices (ETCCDI) has a mandate to address the need for the objective measurement and characterization of climate variability and change by providing international coordination and helping organizing collaboration on climate change detection and indices relevant to climate change detection, and by encouraging the comparison of modeled data and observations. Issues being addressed include the practical aspects of developing guidance and materials for NMHSs -- toolkits including software, documentation, and other material to guide the calculation and use of climate change detection indices and climate data homogenization, improvement of global coverage and assessment of indices. The ET is also concerned with improving indices and analysis tools.



The main purpose of this website is to provide:

- ET approved definitions and guidance on the calculations of climate change indices, along with standard software packages
- Practical guidance on the homogenization of climate data
- Materials for use in ETCCDI training workshops
- Access to online resources of climate indices
- A place for the submission of new or updated indices data

Information on the terms of reference, recent news and activities of the ETCCDI can be found [here](#).

This web site is created and maintained by Xuebin Zhang of Climate Research Division, Environment Canada under the auspices of ETCCDI.

Last updated 2007-01-20

## Conclusions

- Data and monitoring systems are vital
  - Maintain and improve monitoring system
  - Improve access to and exchange of climate data
  - Data rescue
- GSN Archive continues to improve
  - Incorporation of GHCN daily archive an important step ahead
  - Continuing improvements in holdings, qc, homogenization, etc
  - Continue to be some chronic data voids
- Monitoring and observing systems fragile in many regions
  - Also some wonderful advances (e.g., ARGO), but operationalizing these systems is not always easy
- Alternate approaches, like that of ETCCDI help
  - Builds capacity regionally
  - Provides some of the information needed to inform adaptation decisions, but does not allow for complete scientific reproducibility
  - Lots to learn about the properties of deceptively simple indices.



Photo: F. Zwiers

**The End**