Regional perspective and potential contributions

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Event: Moscow heat wave
July 2010
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E-OBS, July 2010
Event: Moscow heat wave
July 2010

31 days with Tx>25°C; normal is 9.5 days
Event: Moscow heat wave

July 2010

16 nights with Tn>20 °C; normal is 0.5 nights
Outline of issues

• The data requirements for assessing extreme events (and for providing climate services) are more demanding than for measuring global warming

• Ongoing European projects illustrate the benefit of joining the databases of Met Services and Universities from different countries in a region

• Successful worldwide coordination of regional activities is provided by the international Expert Team on Climate Change Detection and Indices (ETCCDI)

• Lessons learned; what worked, what didn’t, and which contributions can be expected from regional nodes
Ongoing European projects

1. European Climate Assessment & Dataset (ECA&D, http://eca.knmi.nl)

2. European Reanalysis and Observations for Monitoring (EURO4M, http://www.euro4m.eu)

- Both projects are joint activities of Met Services and Universities sponsored by the European Union

- Goal is to describe the past evolution of weather & climate extremes and to provide near-real-time monitoring information plus access to the underlying daily data (and metadata)

- Complementary approaches are used: regional observation datasets of Essential Climate Variables (stations & satellites) and regional reanalysis (based on advanced weather models)

- Multiple project outcomes: mixture of science and services
Data processing steps in ECA&D

Station observations by 40 NMHSs + 5 Univ. → Daily data + metadata in central data archive → QC + homogeneity tests (4 different) → Selection of useful station series → Daily station records + metadata, Daily gridded products E-OBS, Monitoring extremes: Events + Indices + GEV-theory

Website: http://eca.knmi.nl
QC + homogeneity tests

- Statistical homogeneity tests are complemented by metadata (incl. primary source, station/instrument history and site photos); the results guide the selection of data for monitoring products
Daily gridded products (E-OBS)

- Station records are the only source here
- Daily fields
- 1950 – now
- 0.25 deg and 0.50 deg resolution
- Matching the common RCM grids in Europe
- Associated error fields exist, but these are rarely used!
Daily station records and metadata

- About 60% is “public”, i.e. available from the ECA&D website.

- For the other stations, only the metadata and derived products can be released from the central website http://eca.knmi.nl.

European and similar activities elsewhere are coordinated worldwide by the Expert Team on Climate Change Detection and Indices (ETCCDI)

ETCCDI is a group of scientists jointly sponsored by several international agencies (WMO-CCI/WCRP-CLIVAR/JCOMM)

Defined a list of 27 standardized indices calculated from daily data to describe extremes (often counts of days exceeding fixed or percentile thresholds) used in IPCC TAR and AR4 for observations and models
Regional workshops

- Expert Team also organizes regional workshops with goal to:
  - build capacity to analyze observed changes in extremes
  - improve information services on extremes in the region
  - contribute to a worldwide indices database
  - publish a peer-reviewed paper from each workshop

- Environment Canada provides, maintains, and further develops the R-based workshop software (freely available from http://cccma.seos.uvic.ca/ETCCDI)

- The ETCCDI website keeps record of all past workshops (http://www.clivar.org/organization/etccdi/etccdi.php)
ETCCDI Regional Workshops (complemented by APN)

- GH Africa Workshop (WCRP/World Bank) 04/2010
- Central Africa (USA) 4/2007
- West Indian Ocean (France) 09/2009
- Southeast Asia (USA) 12/2007
- Indonesia, Malaysia, Thailand, Philippines (NL) 12/2009

Peterson and Manton, BAMS, 2008
Lessons learned (1 of 3)

• Integrated approach of ECA&D (data plus monitoring products) works, and could easily form a European contribution (or regional node), providing data and metadata with timely updates on a monthly basis.

• ECA&D website, relational database, software code, and complete documentation is available for use in other regions:
  - currently implemented for Indonesia, Philippines, others in a joint project with BMKG
  - E-OBS gridding technique is currently being used in Mexico and South America.
Lessons learned (2 of 3)

- Worldwide set of ETCCDI indices and regional workshops have enabled a consistent approach to the monitoring, analysis and detection of changes in extremes.
- In many regions where workshops have been held, access to the underlying daily data is limited (which compromises transparency), and updating is problematic.
- Met Services are not keen if their sole role is providing data and metadata; application relevant products are a necessary return of investment.
- Local workshop organizers form potential contact points (regional nodes) for our global effort.
Lessons learned (3 of 3)

- Need to close the gap between rapid IT developments and actually implementing a modern distributed database management system for climate (the latter proves difficult, even in Europe)

- Work needs to comply with WMO ideas on systems/standards, data rescue, and plans for future global climate services; but in the end the actual *deliverables* count rather than *nice words*
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