EXTREMES WITHIN CEOP:

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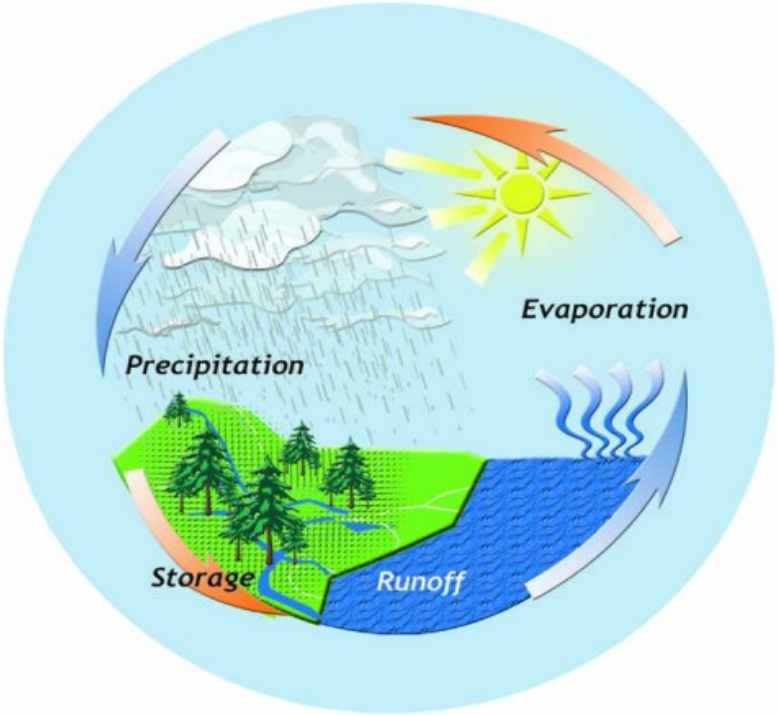
EXTREMES WITHIN GEWEX/CEOP

Objectives ...

- To better document, understand and simulate the occurrence, evolution, structure and role of hydrometeorological extremes within the climate system

- To contribute to their better prediction at various time scales and to addressing societal concerns



Global Energy and Water cycle Experiment

SPECIFIC ACTIVITIES

Associated Types of activities include:

- Definitions
- Datasets (global, regional)
- Processes governing occurrence/chains-of-events
- Model simulations
- Prediction assessment/improvement
- Trends (physically-based/statistical)
- Societal Interactions

MAY 2008 WORKSHOP
Vancouver

In general, the objective of this workshop was to:

Move the Extremes Effort ahead

Specific sub-objectives include:

- Update our progress
- Identify challenges and opportunities
- Enhance collaborations and cohesion
- Consider future activities

A BRIEF SUMMARY

Issues addressed at the workshop organized into:

- Definitions, datasets, and processes
- Statistical and physically based analyses
- Modelling capabilities
- Relation to climate change issues

- A few workshop comments follow …

  need to move forward on a few of these

SCIENTIFIC ISSUES

There are numerous scientific issues that need to be addressed in connection with extremes. A few examples include:

- There is still not a fundamental understanding of the means through which all extremes develop and evolve.
- It needs to be understood why drought can last for weeks or years and can be continuously dry or interspersed with heavy precipitation.
- There is a lack of understanding of the means through which extremes can be inter-related.
- …

DEFINITIONS

This is an on-going issue. Specific considerations include:

- There can be many interpretations as to what constitutes an extreme.
- Variables include frequency, magnitude, duration, spatial extent, and deviation from local means or climatology.
- A key issue is assessing when an extreme is an independent event or is part of a sequence of events.
- It should be recognized that extremes can furthermore be interconnected.

Datasets, Case Studies, Processes

- We do not have access to a comprehensive inventory of the case studies, process studies, and statistical analyses of extremes.
- Many of the areas where important extremes occur are outside areas studied by RHPs.
- The temporal and spatial scales of extremes can vary greatly over a region and between regions
- Different extremes are important for specific conditions.

IDEAS FOR ACTION

- Develop an inventory of extreme events and extreme event studies.
- Encourage RHPs to be opportunistic in identifying and studying droughts in their areas.
- Encourage twinning studies in which similar types of events are studied in different RHPs
- Develop a review article on Extremes
- Document one detailed case study on a continental basis (e.g., the recent North American drought)
- Choose a particular time period—for example 2002—as a global case study for Extremes
- Assess to what extent the same mechanisms are responsible for ‘ordinary’ precipitation as opposed to ‘extreme’ precipitation.
- …

STATISTICAL AND PHYSICALLY BASED ANALYSES

The conduct of statistical studies of extremes is limited because:

- There is no single objective universal definition of extremes.
- Statistical analysis may not reflect the true trends in extremes. Land use changes may for example alter the nature of extremes.
- Many national data sets are not available for the public.
- Many data sets are not sufficiently homogeneous and the metadata are incomplete.
- There are problems in instrument differences.

IDEAS FOR ACTION

- Develop a small set of definitions of drought. This could work with the *Expert Team on Climate Change Detection and Indices* (ETCCDI) as appropriate.
- Develop a task to create a data base for extreme events from data sets contributed by GEO countries. The datasets could include station data as well as satellite, model, and other products. The task should include the all nations in GEO.
- Agree on the complete data needed to characterize extremes.
- Develop procedures whereby researchers could obtain access to the full GPCC data archives.

MORE IDEAS …

- Assess Global Precipitation Climatology Project (GPCP) satellite-based products within Extreme events such as light and heavy precipitation.
- Develop a listing of ‘chains-of-events’ associated with Extremes events.
- Undertake studies of the frequency distributions of extremes using satellite and radar products.
- Include data set developers (for GPCC and GPCP, for example) in trend and related studies since they are familiar with the data issues such as inhomogeneities.
- Develop stronger links with the ensemble forecasting community to investigate the ‘tails’ of distributions.

MODEL FRAMEWORK

- A seamless, integrated, unified modeling framework should be developed. Models within this framework should provide predictions of extremes and their impacts.

IDEAS FOR ACTION

- Undertake comparative analyses of extremes in reanalysis data and long-term forecasts and actual extremes inferred from data. It is key to find areas where large differences exist.
- …

FUTURE OCCURRENCE

- It is anticipated that climate change will lead to increases in the frequency and intensity of extreme events such as droughts and floods. The significance of these increases and their consequences for society need to be understood as a part of a strategy for adapting to Extremes.

SUMMARY

- Extremes is an important aspect of CEOP
- Many suggestions for moving forward
- Break-outs tomorrow ... setting priorities

  print-out + www.drinetwork.ca/extremes

Now … This Session

- 3 presentations

- Hans von Storch (definitions, data, trends)
- Hugo Berbery (issues, data ….)
- Tobias Fuchs (data …)