WORLDWIDE INTEGRATED STUDY OF EXTREMES (WISE)

REPORTING PERIOD: October 2005 – October 2006
STARTING DATE: Formally in October 2004 but No Official Chair until August 2005
WEB ADDRESS: http://www.meteo.mcgill.ca/wise/
CHAIR: Ronald Stewart (2005-2008)

OVERVIEW

Extremes have always been a concern of GHP. At its first meeting in 1995, one of GHP's overall scientific issues was given as:

What feedback mechanisms affect the water cycle and how do these influence wet and dry periods?

A concerted effort to examine this issue was officially started in 2005 after several years of preliminary discussions. It is expected that the exact nature of the objective will evolve somewhat as the effort proceeds. The effort is initially focusing on ***droughts and extended wet periods***.

To better understand the occurrence, evolution and role of extremes within the climate system and to contribute to their better prediction

There are several sub-issues associated with this objective including:

- How do we best define extremes for our purposes?
- What extremes have occurred in the past?
- How do extremes develop, evolve and end within the climate system?
- Have extremes changed in occurrence and character and why or why not?
- Given our progress, how can we contribute to assessing whether extremes may change in the future?

STATUS: PAST YEAR

The effort has formally been underway for a year or so and systematic activities are being started. These include:

- Web site: A web site (accessible through the GHP web site) has been developed on extremes and hazards.
- CEOP Phase II science plan: A section of this science plan has been prepared on one element of our overall WISE strategy, extremes during the CEOP time period.

Several WISE presentations on extremes were given at the CEOP 2006 workshop. These included an overview of WISE as well as detailed studies of extremes within several of the CSE regions.
A WISE break-out meeting was held in conjunction with the CEOP 2006 workshop. This break-out session led to the identification of a set of specific activities that will be initiated within WISE. These have been referred to through this update (definitions, data base, case studies, trends, CEOP).

There have been 6 conference calls so far. At each call, a general update is given on WISE and then specific updates to each of the focal points are given. This is followed by discussions of new actions.

Progress on the first case study is being made. A description follows:

The first WISE case study will be a WEBS (Water and Energy Budget Studies) type diagnostic study of a severe drought event that occurred over the Canadian Prairies from 1999-2004/05. The objectives of the study are to (a) evaluate the surface and atmospheric water and energy budgets for the region during the 1997-2002 period; (b) assess the validity and variability of the budgets that are derived from different source datasets and (c) examine the deviations of the budgets from climatological values for this extreme hydrometeorological event. In addition to these scientific objectives, this pilot study will also attempt to establish mechanisms (e.g., in data transfer and task sharing) to facilitate future WISE collaborative

studies. The water and energy budgets will be evaluated by using mainly global and regional (re-)analysis and model datasets (right now we have data from NCEP-R2, ERA40, CMC and the CRCM and NARR will be added) with validation data obtained from both in situ and remotely-sensed measurements. Apart from the evaluation of standard WEBS variables and parameters, diagnostics that are useful either in the characterization of drought events or in the understanding of their dynamics, such as precipitation recycling or moisture source tracing diagnostics, will also be conducted. WISE members are encouraged to participate in the case study through the contribution of measured, assimilated, modelled or remotely-sensed data for, and in carrying out, the diagnostic calculations.

NEW DIRECTIONS
We do not plan any major new directions over the next year although this may well change depending on the evolution of GEWEX and perhaps even WCRP.

FUTURE: NEXT YEAR'S ACTIVITIES
This will really just be the second year of the effort (starting in August 2006). The focus will be on several issues. This includes:

- Improve our definitions of extremes
- Add to our database of extremes.
- Continue our first case study
- Continue with contributions to trends of extremes
- Work within CEOP as a critical element of our strategy. Many of the extremes being studied took place within the CEOP time frame.

KEY RESULTS
It is too early to provide critical results on this developing working group. In some way, the information assembled on the web site can be considered as a 'key result'.

ISSUES AND RECOMMENDATIONS
One issue is to determine how WISE fits in with other efforts that also, at least in part, examine extremes. Extremes such as droughts and extended wet periods are a huge issue for which all groups can and should contribute. It may be that this whole issue needs to become an overarching one. A particular example of this is in regards trends. WISE certainly can contribute to the assessment of trends through, for example, examining the physical factors responsible for trends and potentially developing new indices for studying trends as a result of physically-based studies.

It is also easy to consider that the scope of WISE could be expanded to consider other extremes in the climate system. This has not been done so far in order to keep a focus.

CONRIBUTIONS TO WCRP FRAMEWORK
There are numerous references to climatic extremes in the WCRP Strategic Framework. WISE is then directly contributing to these.

CONTRIBUTIONS TO SOCIETY AND TO WCRP/GEWEX VISIBILITY
Extremes being examined through WISE represent some of the largest climatic impacts on society. Contributions of WISE to these phenomena will be seen in a very positive manner.

SUMMARY
A concerted effort to address extremes has begun within GEWEX. This effort builds upon past work within GHP and its CSEs and other working groups and it also utilizes opportunities such as CEOP. A multi-point strategy has been developed, a group of researchers has been brought together, and preliminary activities have been initiated. Outcomes of this effort are directly relevant to GEWEX Phase II.

Key Publications

There were publications over the last year that discussed WISE itself. This had been done in 2005.

As a contribution to the first WISE case study, the following publication is quite relevant:

Szeto, K., 2006: Assessing Water and Energy Budgets for the Saskatchewan River Basin. *CEOP Special Issue of J. Meteorol. Soc. Japan (Accepted)*

MEETINGS AND WORKSHOP

Sept, 28, 2005	WISE Break-out session at GHP 2005 Meeting
Oct. 24, 2005	First WISE conference call
Nov. 21, 2005	Second WISE conference call
January 9, 2006	Third conference call
March 3, 2006	WISE meeting at CEOP workshop
May 25, 2006	Fourth conference call
June 29, 2006	Fifth conference call
August 29, 2006	Sixth conference call

Planned Meetings and Workshops

Oct 2006	Initial presentation and discussion of case study #1
Dec 2006	WISE related session at AGU
March 2007	WISE meeting at CEOP workshop
April 2007	Possible WISE related session at EGU
May 2007	Possible WISE session at spring AGU

Members and Their Term Dates

The initial Chair is Ronald Stewart whose term formally began in August 2005 and is expected to be completed within 3 years.

There is not a formal 'organizational structure' for WISE. There are already many (> 25) researchers from around the world who are involved within WISE activities. Some of these are listed on our web site. There is at least one researcher from each CSE of GHP and others are involved as well.