Geophysical Research Abstracts
Vol. 15, EGU2013-6546-1, 2013
EGU General Assembly 2013

Research on Extremes within the GEWEX Hydroclimatology Panel

Ronald Stewart (1), Sam Benedict (2), Jason Evans (3), Jan Polcher (4), and Peter van Oevelen (5)

(1) University of Manitoba, Environment and Geography, Winnipeg, Canada (ronald.stewart@ad.umanitoba.ca), (2) International GEWEX Project Office, Coronado, California, USA (sam.benedict@gewex.org), (3) University of New South Wales, Climate Change Research Centre, Sydney, Australia (jason.evans@unsw.edu.au), (4) LMD, CNRS/IPSL, Paris, France (jan.polcher@lmd.jussieu.fr), (5) International GEWEX Project Office, Silver Spring, Maryland, USA (peter.vanoevelen@gewex.org)

The water cycle is one of the most crucial aspects of climate. Recognizing this, the World Climate Research Programme's Global Energy and Water Exchanges (GEWEX) project focuses on its observation, modelling and understanding. One of the components of GEWEX is GHP, the GEWEX Hydroclimatology Panel. GHP's goal is to understand and predict continental to local-scale hydroclimates for hydrologic applications and to contribute to understanding the larger scale up to global perspective that GEWEX needs to address.

Extremes are a fundamental aspect of the water and energy cycle. Extreme events, particularly those associated with hydrometeorology, are of special interest for GHP. Phenomena such as drought, heavy precipitation, floods and related issues such as heat waves occur everywhere. Such phenomena can also occur simultaneously or in close spatial and/or temporal proximity.

The overall objectives of Extremes-related activities within GHP are to better document, understand and simulate the occurrence, evolution, and structure of such extremes; to contribute to their better prediction at various temporal and spatial scales; and to address associated societal concerns.

GHP addresses such issues from a regional as well as a global perspective. Under GHP auspices and in compliance with established criteria, several Regional Hydroclimate Projects (RHPs) have been successfully completed. Current projects include BALTEX (Baltic Sea Experiment), HyMeX (Hydrological cycle in the Mediterranean Experiment), MAHASRI (Monsoon Asian Hydro-Atmosphere Scientific Research and Prediction Initiative), and NEESPI (Northern Eurasia Earth Science Partnership Initiative). New ones are being developed over Australia and central Canada and possibly over Africa and South America. Products have been produced from previous RHPs over North and South America, Australia and Africa and such information is also available. Collectively, past, current and future RHPs cover a diversity of climatic regions.

Since extremes are a major issue everywhere, the regional activities within GEWEX/GHP collectively provide a global perspective. These activities are based on the foundation of the RHPs but they also encompass research on extremes that is linked with activities producing global datasets (such as GPCC and GPCP) and others addressing regional climate (such as CORDEX).

Current research is concerned with several issues. These include extreme precipitation rates, drought, and relations of such phenomena to disasters and water resources. These focal points are being addressed in the RHPs including BALTEX, HyMeX and NEESPI. Data are being collated on these issues in different regions and this allows for the examination of the scientific issues described earlier, including similarities and differences stemming from regional factors. Other research focal points are being developed.

This presentation provides a perspective on the goals of and approach for extremes-related research within GHP and it illustrates its progress. Recent findings include research that shows that extreme precipitation rates occur under a variety of conditions that are generally not well simulated in climate models. As well, drought varies greatly between regions with varying driving forces, internal structures, and cessation mechanisms. Such extremes lead to flooding, water scarcities, and related disasters and GHP efforts are contributing to their better prediction at multiple temporal and spatial scales.