

**WCRP-UNESCO Workshop on  
Metrics and Methodologies for Estimation of Extreme Climate Events  
27-29 September 2010 at UNESCO Headquarters (Paris, France)**

**Monday 27 September 2010**

**08:00** – Registration

**09:00-09:10** – Workshop objectives (*Olga Zolina, MIUB, Germany*)

**09:10-09:30** – Welcome

*Alberto Tejada-Guibert* (Director a.i. of the Division of Water Sciences and Secretary of the International Hydrological Programme UNESCO/IHP)

*Jorge Luis Valdes Santurio* (Head of the Ocean Science Section UNESCO/IOC)

*Gero Michel* (Managing Director, Willis Research Network)

*Valery Detemmerman* (WCRP)

**Session 1** Hydrological extremes (precipitation, flooding and river discharge), including compound hydroclimate extremes (Chairperson: *Olga Zolina*)

**09:30** Physics and origins of hydroclimate extremes (*Kevin Trenberth, NCAR, USA*)

**10:00** Atmospheric warming and the amplification of precipitation extremes (*Brian Soden, University of Miami, USA*)

**10:20** Investigating mechanisms of future changes in precipitation extremes simulated in GCMs (*Seita Emori, Center for Global Environmental Research Tsukuba, Japan*)

**10:40** How much can global models tell us about future changes in drought and flood conditions? (*Herve Le Treut, Institut-Pierre-Simon-Laplace, France*)

**11:00 – 11:30** – coffee\*

**Session 1 continues** (Chairperson: *Ron Stewart*)

**11:30** Precipitation extremes and flooding: Evidence of nonstationarity and hydrologic design implications (*Dennis Lettenmaier, University of Washington, USA*)

**11:50** Observed changes in heavy precipitation events and extratropical cyclones (*David Easterling, NCDC, USA*)

**12:10** Trends in U.S. extreme snowfall seasons since 1900 (*Kenneth Kunkel, Desert Research Institute, USA*)

**12:30** Investigation of the 2006 drought and 2007 flood extremes at the Southern Great Plains through an integrative analysis of observations (*Xiquan Dong, University of North Dakota, USA*)

**12:50 – 14:00** – lunch

**Session 2** Extremes in temperature conditions, heat waves and dry spells (Chairperson: *Albert Klein Tank*)

**14:00** Past and future changes in temperature extremes in Australia: a global context (*Lisa Alexander, University of New South Wales, Australia*)

**14:20** Detecting anthropogenic influence on extreme daily temperature at regional scale (*Francis Zwiers, Meteorological Service of Canada, Canada*)

**14:40** European heat waves in a changing climate (*Christoph Schär, ETH Zurich, Switzerland*)

**15:00** Heat waves in Mediterranean climate regimes (*Alexander Gershunov, Scripps Institute of Oceanography, USA*)

15:20 The structure of drought (*Ron Stewart, University of Manitoba, Canada*)

15:40 - 16:10 – coffee\*

Session 2 continues (Chairperson: *Sergey Gulev*)

16:10 Storms, drought, and wetness: Meteorological extremes on different time scales (*Richard Blender, University of Hamburg, Germany*)

16:30 Contributions of drought studies to the Global Earth Observation System of Systems (GEOSS) (*Rick Lawford, University of Manitoba, Canada*)

Briefing and discussion session (Chair and moderator: *Sergey Gulev*)

16:50 Briefing on the recent workshops and activities on extreme events (5 minutes each)

- ❖ GEWEX/WCRP Extremes Workshop, Vancouver, Canada, May 2008 (*Ron Stewart*)
- ❖ IPCC Special Report of extreme events and disasters, Oslo, Finland, March 2009 (*Francis Zwiers*)
- ❖ Workshop on Extreme events in climate and weather, Banff, Canada, 22-27 August 2010 (*Peter Guttorp*)
- ❖ Weather and Climate Extremes During the Past 100 years, Diessenhofen, Switzerland, 7-9 June 2010 (*Urs Neu*)
- ❖ IMILAST project (Intercomparison of mid latitude storm diagnostics) (*Urs Neu*)
- ❖ Workshops on North American and global drought monitoring, Asheville, USA, April 2010 (*Rick Lawford*)
- ❖ GEO-DRI workshop Winnipeg, Canada, May 2010 (*Rick Lawford*)
- ❖ Storm Surge Risk and Management Congress, Hamburg, Germany, 13-17 September 2010 (*Hans von Storch*)
- ❖ Workshop on Extremes in Weather and Climate, Bonn, Germany, June 2010 (*Petra Friederichs, Douglas Maraun*)
- ❖ Creating surface temperature datasets to meet 21<sup>st</sup> Century challenges, Exeter, UK, September 2010 (*Albert Klein-Tank*)
- ❖ NASA NEWS extreme workshop, Grand Forks, ND, USA, 15-16 July 2010 (*Xiquan Dong*)

17:50 – Discussion

18:30 – Reception (Sponsored by Willis Research Network)

## Tuesday 28 September 2010

08:00 Participants mount their posters in the Foyer

### Session 3 Extreme tropical and extratropical cyclones and associated wind waves and storm surges (Chairperson: *Francis Zwiers*)

08:30 Observed tropical cyclone variability (*James Kossin, University of Wisconsin, USA*)

08:50 Extreme extratropical cyclones and their characteristics (*Sergey Gulev, IORAS, Russia*)

09:10 Perceived as a regional phenomenon, but really of global concern: storm surges (*Hans von Storch, GKSS, Germany*)

09:30 Atlantic hurricanes and climate change: modeling studies (*Thomas Knutson, GFDL, USA*)

09:50 Quantitative assessment of wind storms and extreme extra-tropical cyclones under climate change (*Gregor Leckebusch, Freie University Berlin, Germany*)

10:10 – 11:00 – coffee\*, posters

### Session 4 Methodologies for estimation extremes (Chairperson: *David Stephenson*)

11:00 Stochastic models for weather extremes (*Anna Panorska, University of Nevada, USA*)

11:20 Extreme value theory and single-event attribution (*Richard Smith, University of North Carolina, USA*)

11:40 Statistical inference for space-time extremes (*Anthony Davison, EPFL, Switzerland*)

12:00 Extreme value analysis and projection in light of the changing climate (*Xiaolan Wang, Environment Canada, Canada*)

12:20 – 14:00 – lunch, posters

### Session 4 continues (Chairperson: *William Gutowski*)

14:00 Uncertainty in rare event statistics and the difficulties in comparing climate models to observations (*Michael Wehner, Lawrence Berkeley National Laboratory, USA*)

14:20 An objective identification technique for regional extreme events (*Fumin Ren, Beijing Climate Center, China*)

14:40 Advanced metrics of extreme precipitation events (*Olga Zolina, University of Bonn, Germany*)

### Session 5 Risk assessment (Chairperson: *Ivan Kuhnel*)

15:00 Estimation of future changes in extreme climate events for the user and decision-making communities (*Clare Goodess, Climatic Research Unit, University of East Anglia, UK*)

15:20 Future risk of global drought from downscaled, bias corrected climate projections (*Eric Wood, Princeton University, USA*)

15:40 - 16:10 – coffee\*, posters

### Session 5 Risk assessment (Chairperson: *Ivan Kuhnel*)

16:10 Risk Assessment and future sea-level extremes (*John Hunter, Antarctic Climate & Ecosystems Cooperative Research Centre, Australia*)

16:30 TBD (*Gero Michel, Willis Research Network, UK*)

Discussion and introduction to breakout groups (Chairperson and moderator: *Kevin Trenberth*)

16:50 – 17:00 Introduction of break-out groups (*Olga Zolina, William Gutowski, Ron Stewart*)

17:00 – 18:00 General discussion - 1

Proposed discussion topics:

- ❖ What is your view about how natural variability and global climate change intersect in producing extremes?
- ❖ What is the relationship among different extremes? This includes how droughts relate to heat waves, snow melt and early runoff relate to temperatures, or more generally how temperatures relate to precipitation and flooding.
- ❖ How do we translate or communicate these changing risks to the general public?
- ❖ Is there commonality between tropical and extratropical cyclone risk factors and changes?
- ❖ What changes in extremes are "global" vs what are regional?
- ❖ How do perceptions of extremes depend on time-scale?
- ❖ What is considered extreme? How much is it dependent on impact sector, geography, season, etc.?
- ❖ What risks are posted by compound extremes (e.g., heavy rains immediately after a drought)?

**Wednesday 29 September 2010**

Special session: Key-note kick-offs for breakout groups (Chairperson: *Valery Detemmerman*)

08:30 What data do we require for extremes analysis and what is available? (*Albert Klein-Tank, KNM, the Netherlands*)

08:50 Precipitation Extremes in the NARCCAP Simulations (*William Gutowski, Iowa State University, USA*)

09:10 Statistical methodologies for exploring and quantifying extreme weather and climate (*David Stephenson, University of Exeter, UK*)

09:30 - 13:00 Breakout groups with coffee\* served at 10:30

- ❖ Data requirements and availability, including data policy (Chair: *Olga Zolina*, rapporteur: *Rick Lawford*)
- ❖ Representation of extreme events in climate and operational models, including consideration of scaling and spatial scales of extremes (Chair: *William Gutowsky*, rapporteur: *Jozef Syktus*)
- ❖ Methodologies for estimation of extremes across areas and disciplines (Chair: *Ron Stewart*, rapporteur: *David Stephenson*)

13:00 – 14:30 – lunch, posters

Discussion session on break-out groups (Chairperson and moderator: *William Gutowski*)

14:30 Report of breakout group "Data requirements and availability, including data policy" (*Rick Lawford, Olga Zolina*)

14:40 Report of breakout group "Representation of extreme events in climate and operational models, including consideration of scaling and spatial scales of extremes" (*Jozef Syktus, William Gutowski*)

14:50 Report of breakout group "Methodologies for estimation of extremes across areas and disciplines" (*David Stephenson, Ron Stewart*)

15:00 Discussion on breakout group reports

15:30 – 16:00 – coffee\*, posters

General discussion – 2 (Chairperson and moderator: *TBD*)

16:00 Final discussion, Workshop recommendations

18:00 Workshop ends

\* Coffee breaks sponsored by Willis Research Network