Large Scale Circulation Patterns Associated With North American Short-term Temperature and Precipitation Extreme Events
aka: The 'Extremes' WG

Co-Chairs: Richard Grotjahn and Matt Barlow

US CLIVAR 2013 Summit Report

M. Barlow and R. Grotjahn

'Extremes' WG: focus & purpose

Try to make focus narrow enough for progress:

- North American region

- Short term (approx. 1 to 5 days)

- Temperature (heat waves and cold air outbreaks) and Precipitation (emphasizing processes other than hurricanes, which has its own working group)

- Events associated with Large Scale Meteorological Patterns (LSMPs): synoptic to continental-scale circulations that are large enough to be well-captured by observations and models, and to have some prediction and down-scaling potential. These patterns are defined by the extreme events, rather than in terms of known modes (ENSO, MJO, NAO, etc.) though such modes may play a role

Main thrusts:

- Identifying the patterns, investigating the underlying dynamics, assessing their simulation in current models

- Identifying main gaps in understanding

'Extremes' WG: Example Pattern

Example of Large-Scale Meteorological Pattern
(LSMP) from Richard's work on California Hot Spells

500hPa Z at 36hr, 24hr, & 12hr before and at onset of California hot spells.
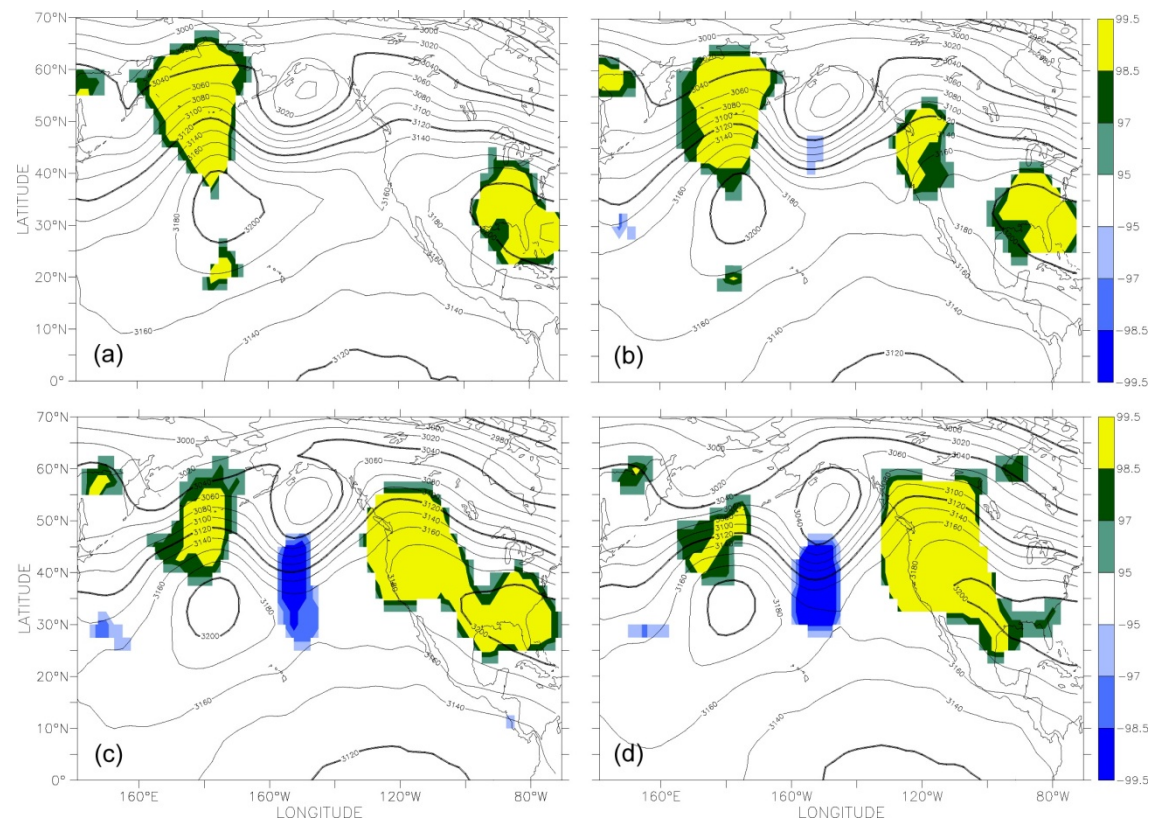
'Extremes' WG: membership/expertise

Regular committee members

Richard Grotjahn – Co-Chair (UC Davis): dynamics, synoptics & modeling of T extremes and extreme frontal system precip.

Mathew Barlow – Co-Chair (UMASS Lowell): large-scale climate variability and change on local conditions; extreme precip.

Robert Black (Georgia Tech): LSCPs and extreme weather in Southeastern US

Joshua Xiouhua Fu (U. Hawaii): Tropical dynamics, modeling and prediction of monsoon, MJO, and extreme events

Alexander Gershunov (Scripps; UC San Diego): climate extreme events; teleconnections; extreme weather statistics

William Gutowski (Iowa St. Univ.) atmospheric dynamics in climate, dynamics of the hydrologic cycle and regional climate.

Rick Katz (NCAR): extreme statistical methods applied to meteorological data

Arun Kumar (CPC NCEP/NOAA): Seasonal climate variability; weather-climate connection; climate models diagnostics

Lai-Yung (Ruby) Leung (PNNL, Washington): Mesoscale modelling, regional climate model downscaling

Young-Kwon Lim (NASA GSFC) Climate variability and weather/climate extremes in observations, reanalysis, & model data.

Russ S. Schumaker (Colo. St. Univ.): organized precipitation systems producing extreme amounts of precipitation

Michael Wehner (LBL, California): extreme value statistics applied to observed and modeled precipitation and temperature

International Members

Tereza Cavazos (CICESE, Mexico) Extreme rainfall under climate change conditions. CLIVAR-VAMOS extremes WG member.

John Gyakum (McGill U., Canada) Synoptic analyses of atmospheric blocking; Heavy precipitation events

Contributing Members

Anthony Barnston (IRI Columbia U): seasonal forecasting

Michael Bosilovich (GMAO, NASA/GSFC): Reanalysis and data issues

'Extremes' WG: objectives

1. Synthesize knowledge on LSMP–extremes links
   (2 journal articles; 2013 workshop)
2. Identify key questions & knowledge gaps
   (2 journal articles; 2013 workshop)
3. Develop methodology/protocols using LSMPs in observation and model output analyses
   (2013 workshop; follow-up publication)
4. Help to develop community of extremes researchers

'Extremes' WG: activities

To date:
- Teleconferences
- Wiki & other web presence for information sharing
- 2 survey papers (P and T separate) begun (structure, preliminary section leaders)
- WG meeting at Fall AGU
- Workshop planning

Planned and in-progress:
- 2 survey papers (P extremes; T extremes)
- Workshop in summer 2013
- Post-workshop document
- Future work / CLIVAR science plan / extremes community
- Theme song and internet meme

'Extremes' WG: points for feedback

- Useful next steps, especially as relating to science plan

- Connecting with other communities doing similar or overlapping work

- Working towards a more developed language of extremes (dynamics and impact-based separation of timescales and identification of key metrics, etc. -- what types of extremes are most important to focus on first)