

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

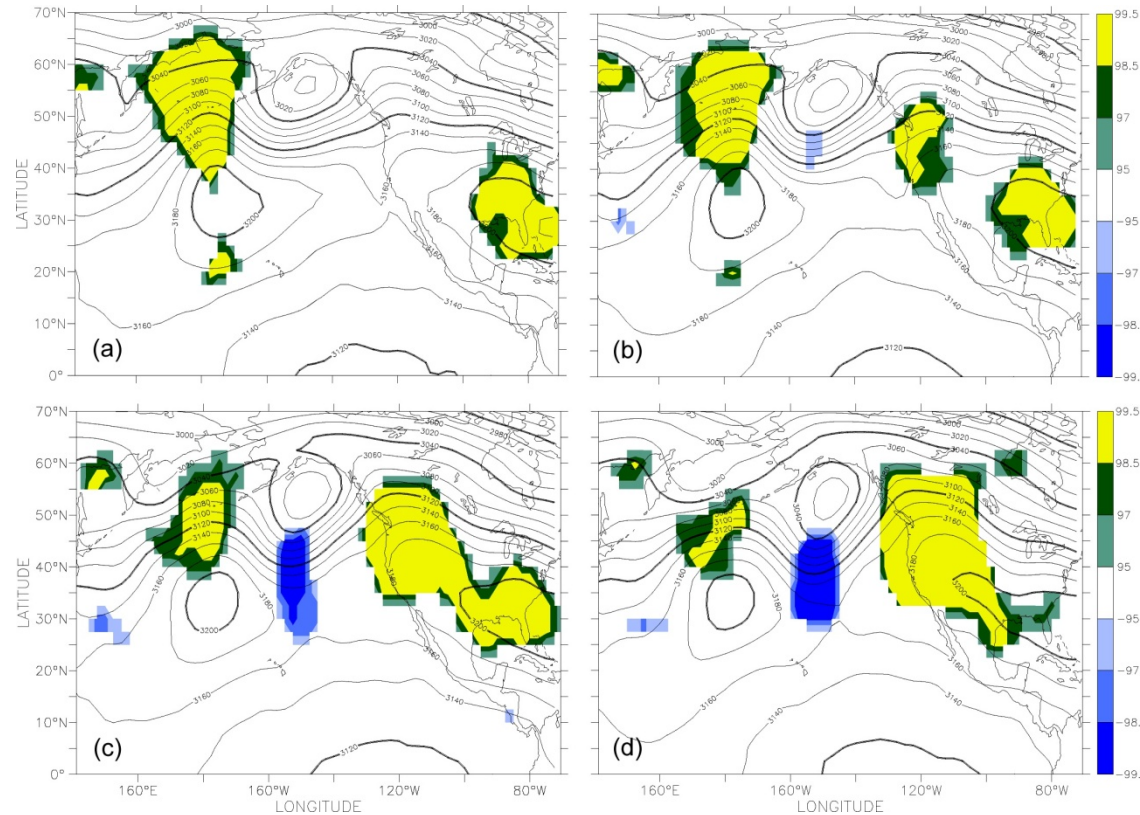
US CLIVAR 2012 Summit Report
R Grotjahn & M Barlow

'Extremes' WG: focus & purpose

- Selected types of extreme events:
 - North American region
 - Short term (5 days or less)
 - Temperature (hot spells & CAOs) and Precipitation (not from TCs)
 - Strongly associated with Large Scale Meteorological Patterns (LSMPs)
 - LSMPs are NOT LF phenomena (not ENSO, not MJO, not NAO, etc.) though such LF may influence environs
- Main thrusts
 - Identifying LSMPs, their dynamics, their simulation
 - Identifying various gaps in understanding

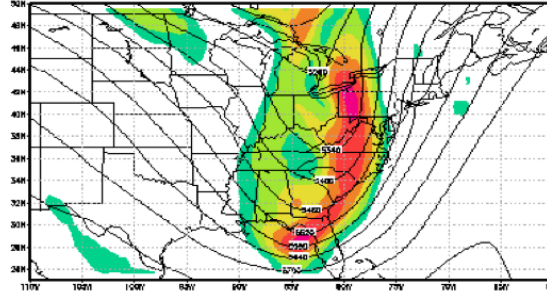
'Extremes' WG: CA hot spells LSMP

- Large scale patterns with a 'synoptic' time scale that are highly associated
- Distinct from climate modes (e.g. ENSO) but may be influenced by them.
- Example: Z_{500} at 36hr, 24hr, & 12hr before and at onset of California hot spells.

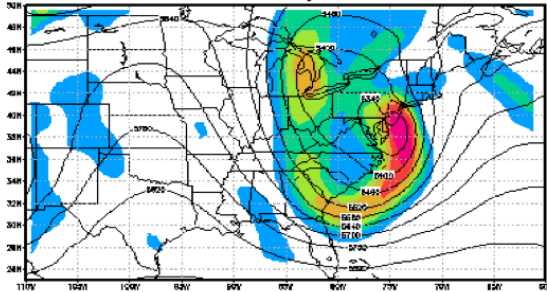


500hPa HGT & VORT for Peak Merrimack River Flooding Events (which are top 100 daily precipitation extremes)

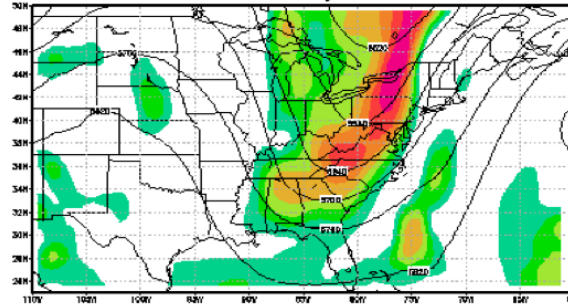
Absolute Vorticity 500 hPa



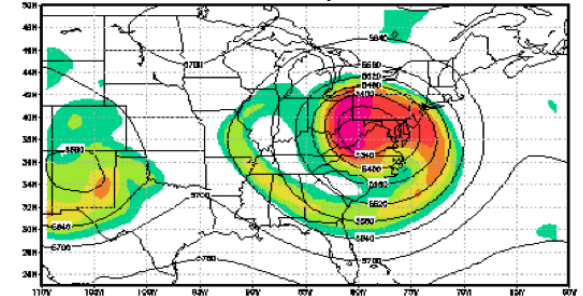
Absolute Vorticity 500 hPa



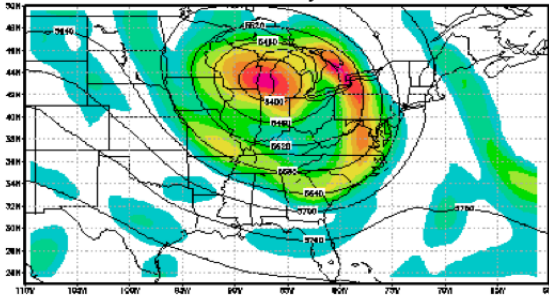
Absolute Vorticity 500 hPa



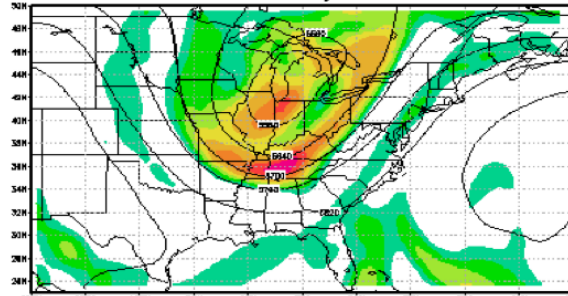
Absolute Vorticity 500 hPa



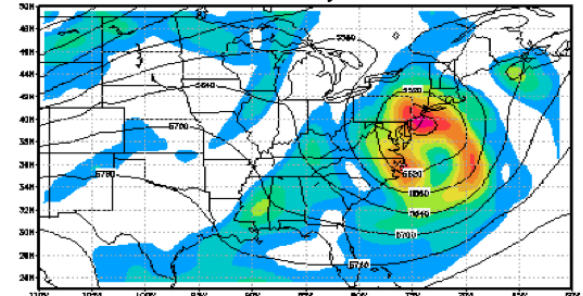
Absolute Vorticity 500 hPa



Absolute Vorticity 500 hPa



Absolute Vorticity 500 hPa



'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 (journal articles; 2013 workshop)
2. Identify key questions & knowledge gaps (journal articles; 2013 workshop)
3. Develop methodology/protocols using LSMPs in observation and model output analyses (2013 workshop; follow-up publication)
4. Apply such tools in preliminary assessment of models LSMP simulation (unfunded; ad hoc)

'Extremes' WG: activities

- To date:
 - Two teleconferences
 - Decision to have separate T and P review articles
 - Wiki & other web presence for information sharing
 - Informal meetings (e.g. LSMPs, knowledge gaps)
- Planned
 - Monthly teleconferences
 - 2 survey papers (P extremes; T extremes)
 - In person meeting 7-8 December (fall AGU)
 - Workshop in summer 2013
 - Post-workshop document

Appendix:

CCSM4: CA heat wave LSMP circ. index

