

# Spanning the Weather-Climate Continuum

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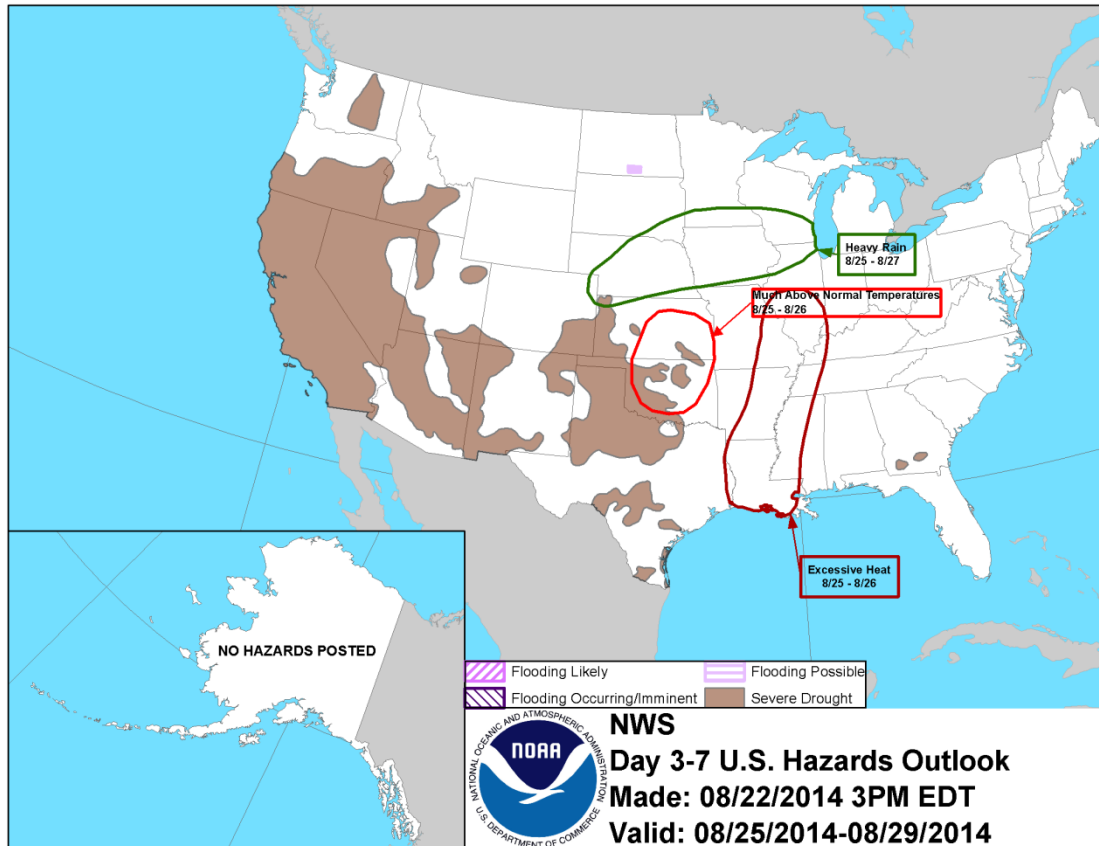
Workshop on the Development of Climate Information Systems  
for Heat Health Early Warning  
July 28-30, 2015  
Chicago, IL

# Outline

- Review of current CPC heat related products and services
- Work towards an experimental Week-2 excessive heat event outlook product
- Climate perspective on heat predictions beyond Week-2

Review of current CPC  
products and services

# Current Heat Related Products



Hazards include both:




(1) Much above normal temperatures

Expectations that temperatures will approach or exceed those representing the top 1/8 of historical range

(2) Excessive heat

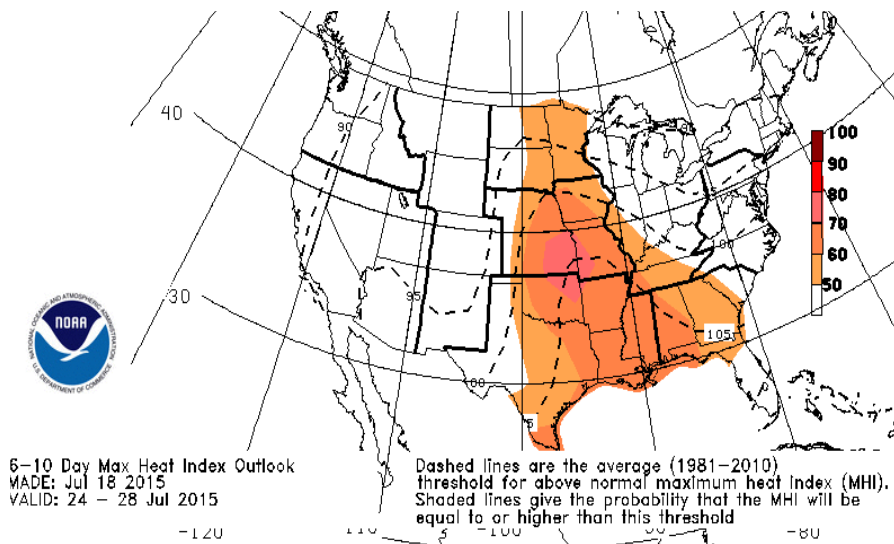
Expectations that the combined effects of temperature and humidity may reach heat indices greater than 105F

## Legend

 High Winds	 Much Above Normal Temps
 Significant Waves	 Much Below Normal Temps
 Severe Weather	 Excessive Heat
 Heavy Rain	 Flooding Likely
 Freezing Rain	 Flooding
 Heavy Snow	 Flooding Possible
 Heavy Precipitation	 Enhanced Wildfire Risk
	 Severe Drought

# Current Heat Related Products

- Days 6-10 and 8-14 maximum heat index outlook
- Released daily from April 1st through September 30th
- Dashed contours depict threshold for the above normal tercile maximum heat index
- Shading represents the probability that this threshold will be exceeded during period



Example outlook

[Other information available in this outlook suite includes:](#)

1. Outlook maps for probabilities for max heat index exceeding 90F, 95F, 100F, 105F, 110F, 115F

2. Probabilities for mean heat index exceeding 85F, 90F, 95F for 2 days, 3 days or 1 day

Experimental Week-2 excessive  
heat event outlook

# Week-2 Excessive Heat Event Outlook

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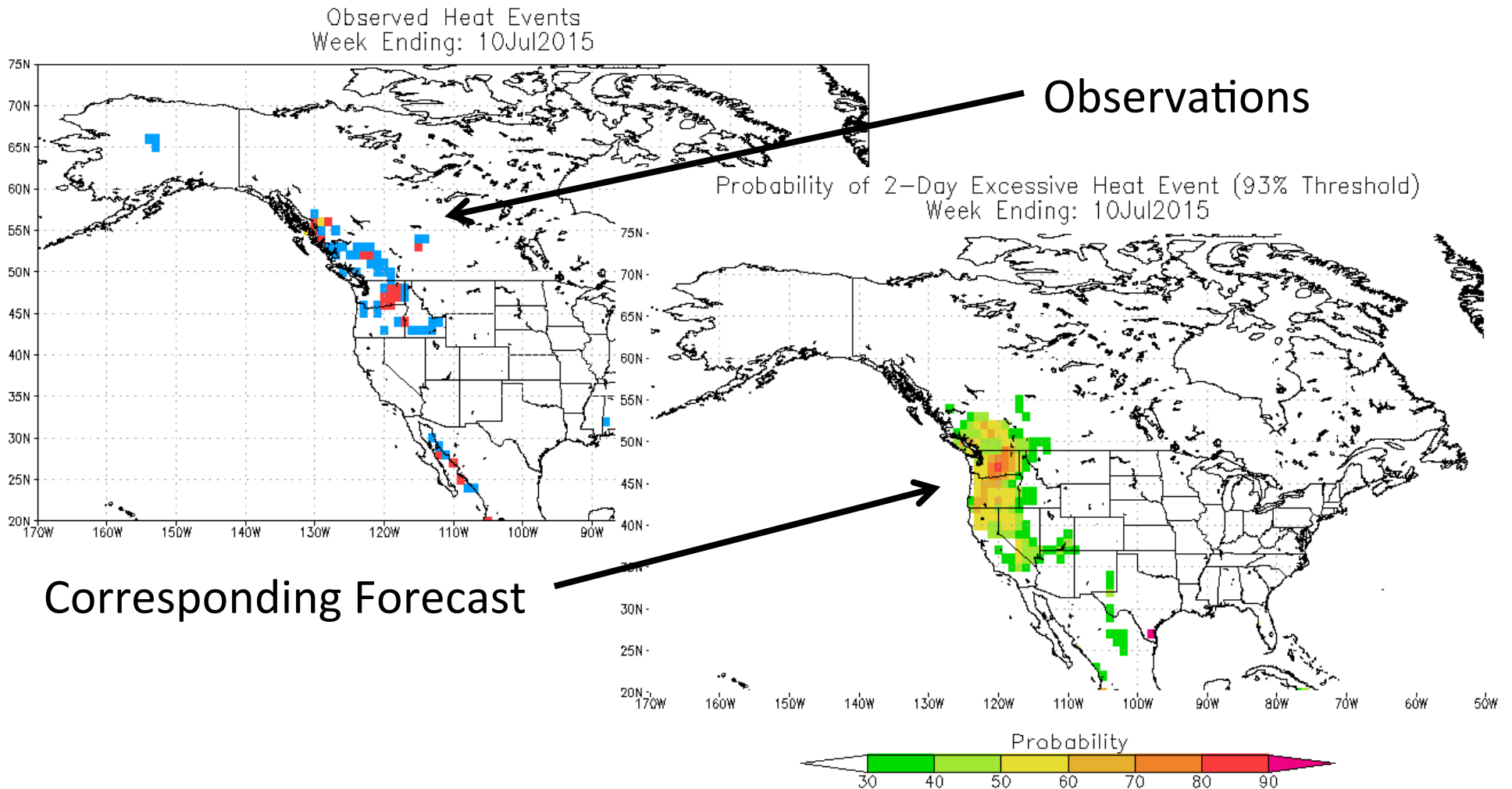
Work led by Augustin Vintzileos – University of Maryland ESSIC

- Extreme heat days are defined based on heat index
- Extreme heat event is defined as at least two consecutive days exceeding a given percentile threshold (90%, 95% and 99%)
- Factors included in metric are time of the year, location, duration, daily magnitude
- New product will allow better temporal resolution of information, and use of state of the art datasets

# Week-2 Excessive Heat Event Outlook

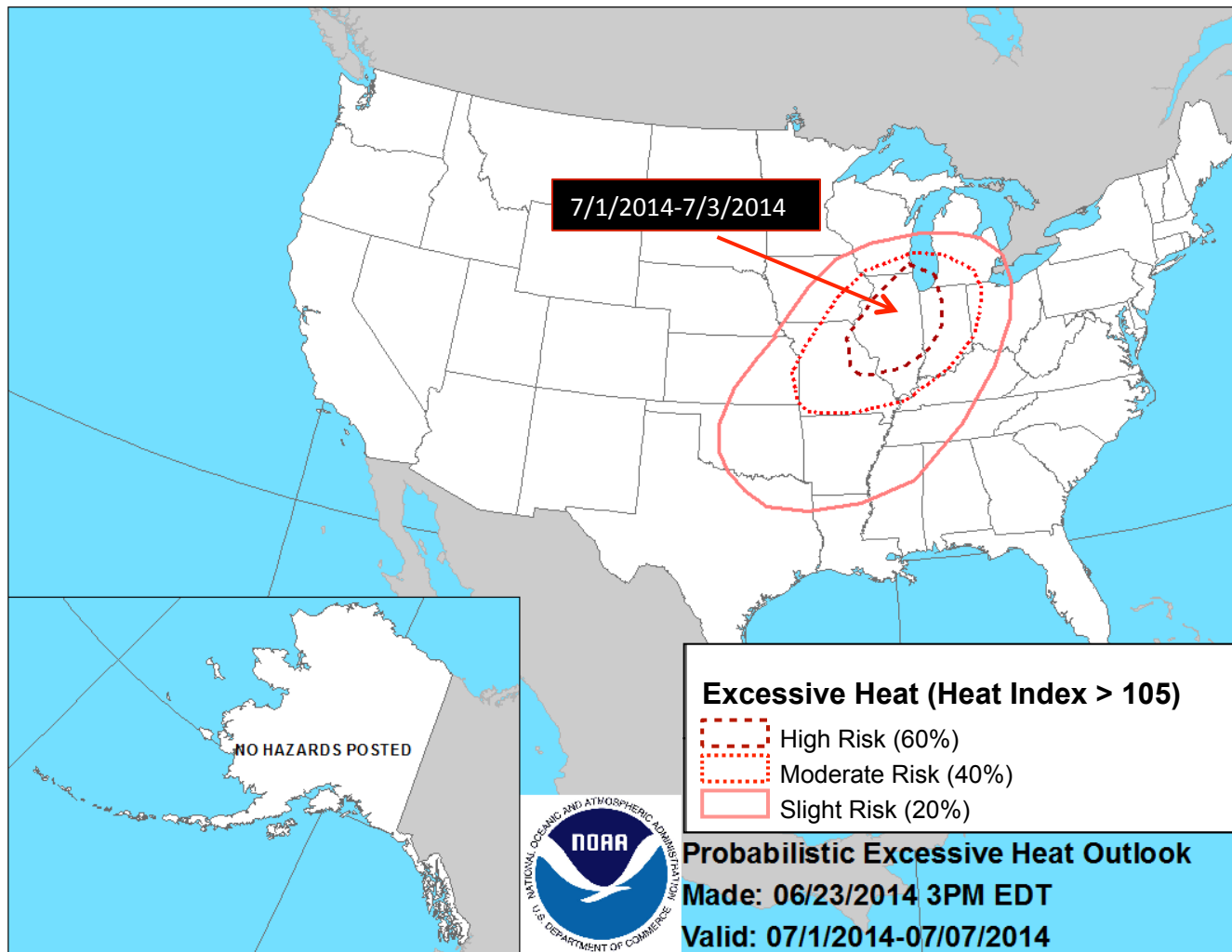
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- **Monitoring systems developed to study observed events**
- **Ensemble GFS based forecast maps running in realtime**





# Experimental Excessive Heat Event Outlook



- Experimental product must meet the needs of several sectors and applications
- Constructive input from participants at this meeting is helpful and appreciated

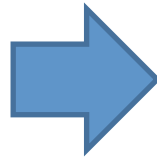
Additional climate perspective  
beyond Week-2

# Some Challenges from a Climate Perspective

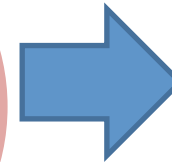
- Any predictable meteorological signal will be significantly weaker with high uncertainty (lower confidence) than short term forecasts.
- If you relax criteria, what is an acceptable number of false alarms? For extended range prediction (Weeks 2-4 and beyond), the paradigm may very well need to be different.

# Prospects for Subseasonal Heat Predictions

Predictable, slow varying, climate oscillations such as tropical variability (e.g. MJO)



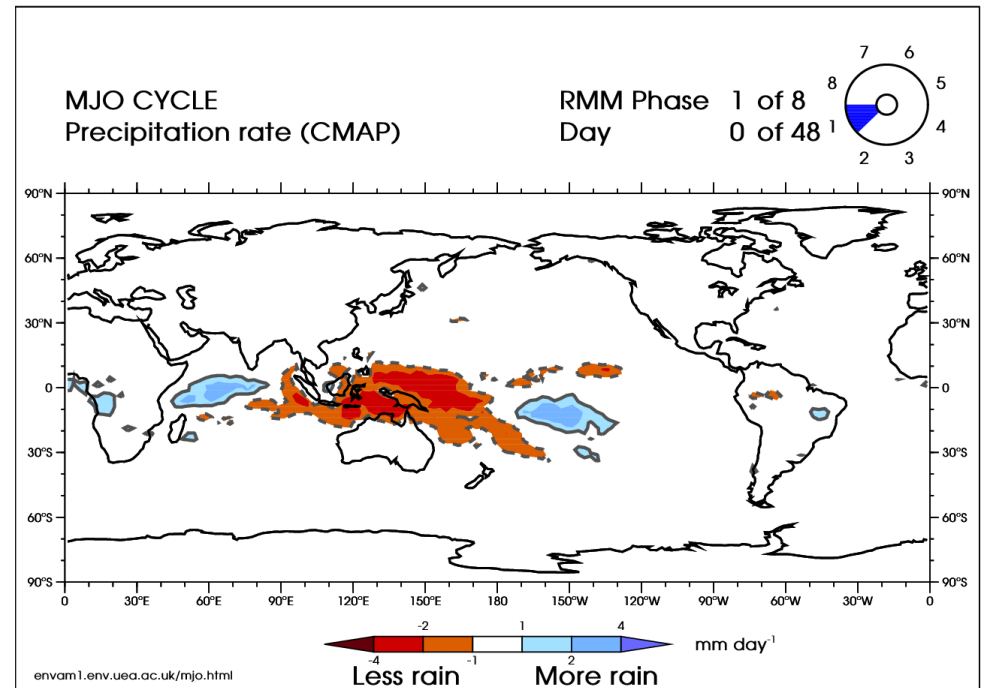
Modulate the probability of occurrence of extreme weather events



Modulate probability of occurrence of critical impacts including the heat-health relationship

## An important example:

The Madden Julian Oscillation (MJO) can impact the pattern of high and low pressure in the Extratropics and can result in high impact events



Courtesy: Augustin Vintzileos – University of Maryland ESSIC

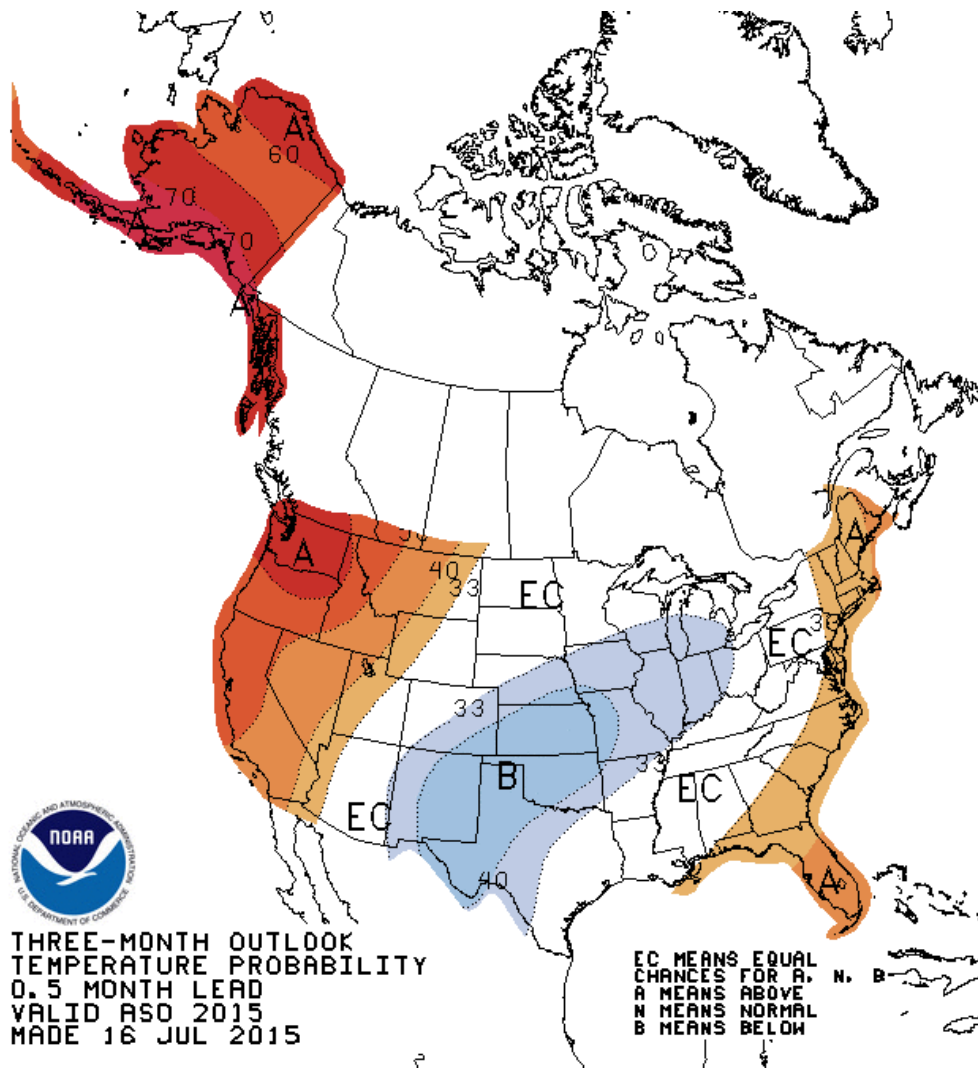
# Prospects for Subseasonal Heat Predictions

- An important alternative approach could be extending the concept of synoptic classification to subseasonal forecasts (*i.e.*, Week 3-4)

**• Work pioneered by Dr. Scott Sheridan and colleagues at Kent State University and well documented in the literature for a wide array of applications (especially health related).**

- Adopted by NWS WFO operations but is focused on shorter time scales (within one week)
- CPC hopes to work closely with Dr. Sheridan and colleagues on subseasonal time scales if funding becomes available

# Gap, Challenge and Opportunity



- CPC prepares outlooks for temperature and precipitation at the seasonal time scale
- Outlooks are for above, below or near average tercile categories of mean 3-month temperature
- Perhaps research can look at what may be possible at these time scales (i.e. number of extreme heat events over a given season)

# Summary

- CPC does produce operational outlooks targeting excessive heat which includes information as part of the U.S. Hazards Outlook and Week-2 heat index products.
- CPC plans to develop and experimentally implement during FY16 an initial excessive heat event outlook covering the Week-2 period with the initial research work focusing on how to best utilize and calibrate numerical forecast model information.
- Ongoing research efforts will continue to try to better understand how to best utilize subseasonal and seasonal climate patterns for excessive heat early warning information.

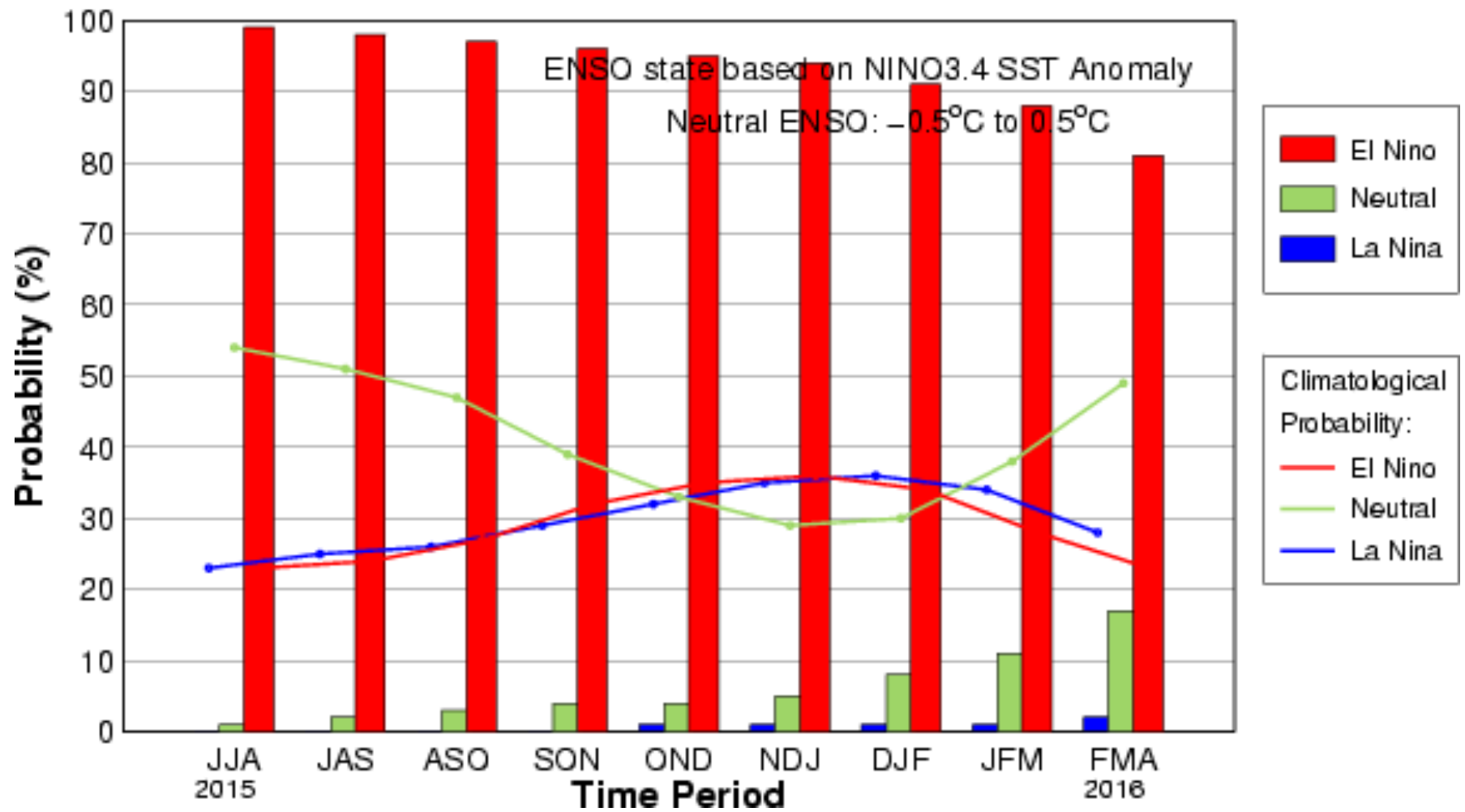
Thank you for your attention

Comments, questions or suggestions?

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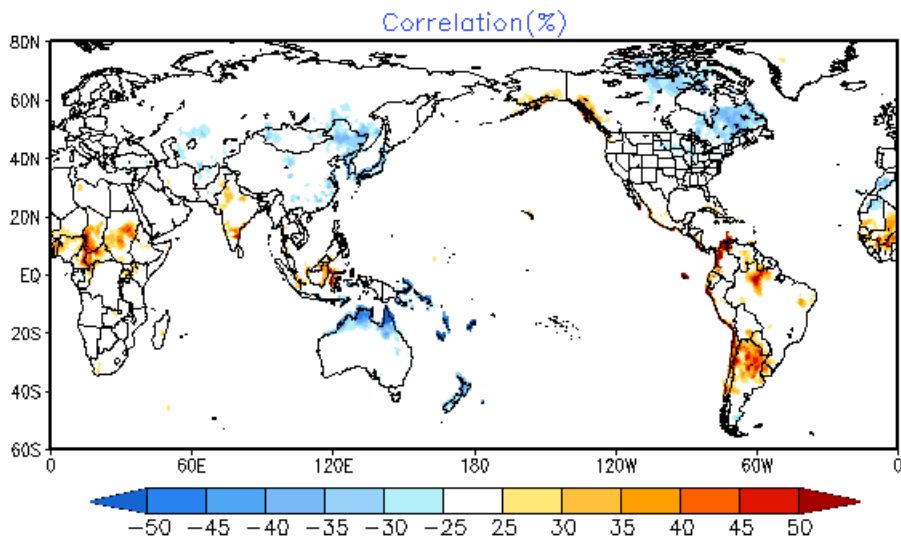
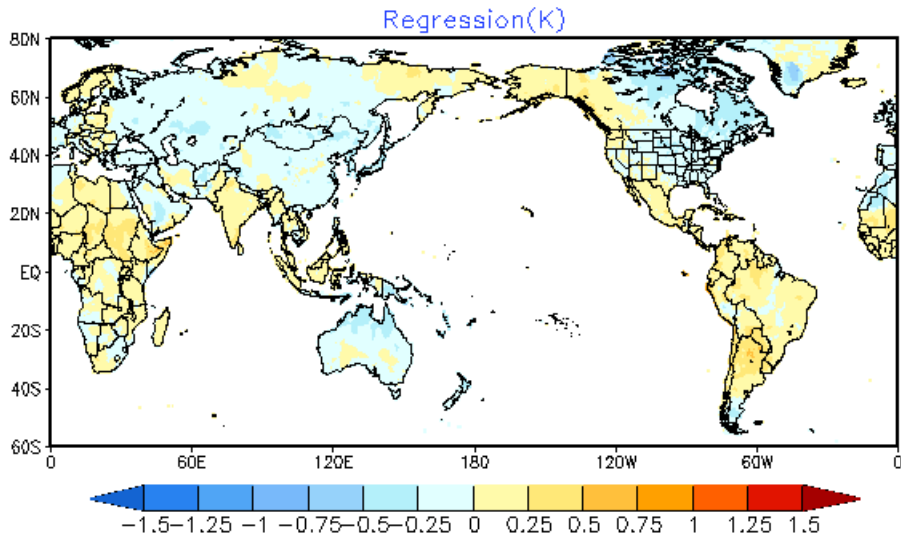


## Early-Jul CPC/IRI Consensus Probabilistic ENSO Forecast



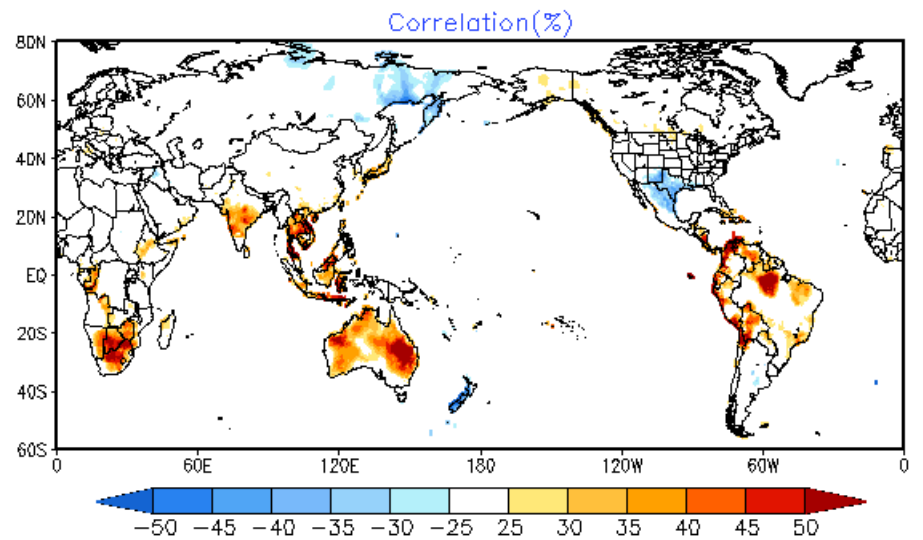
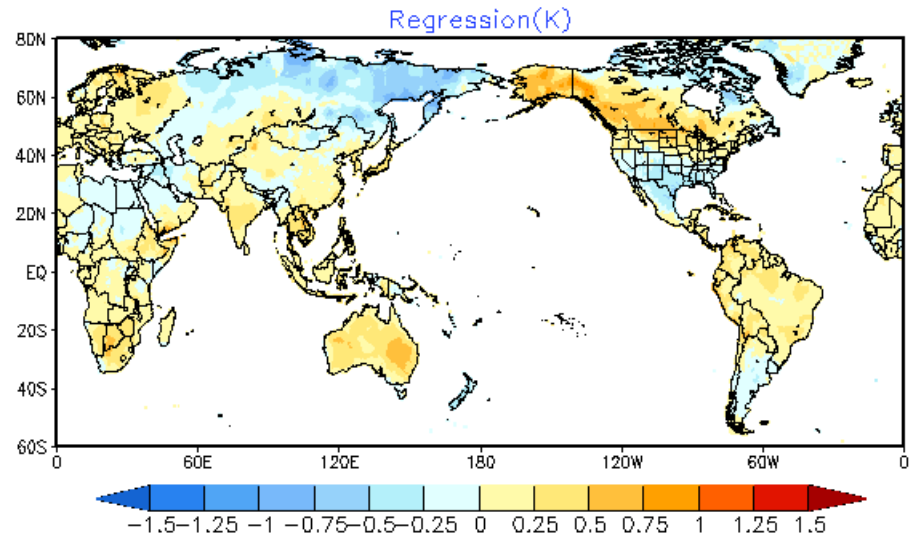
## Jul-Aug-Sep

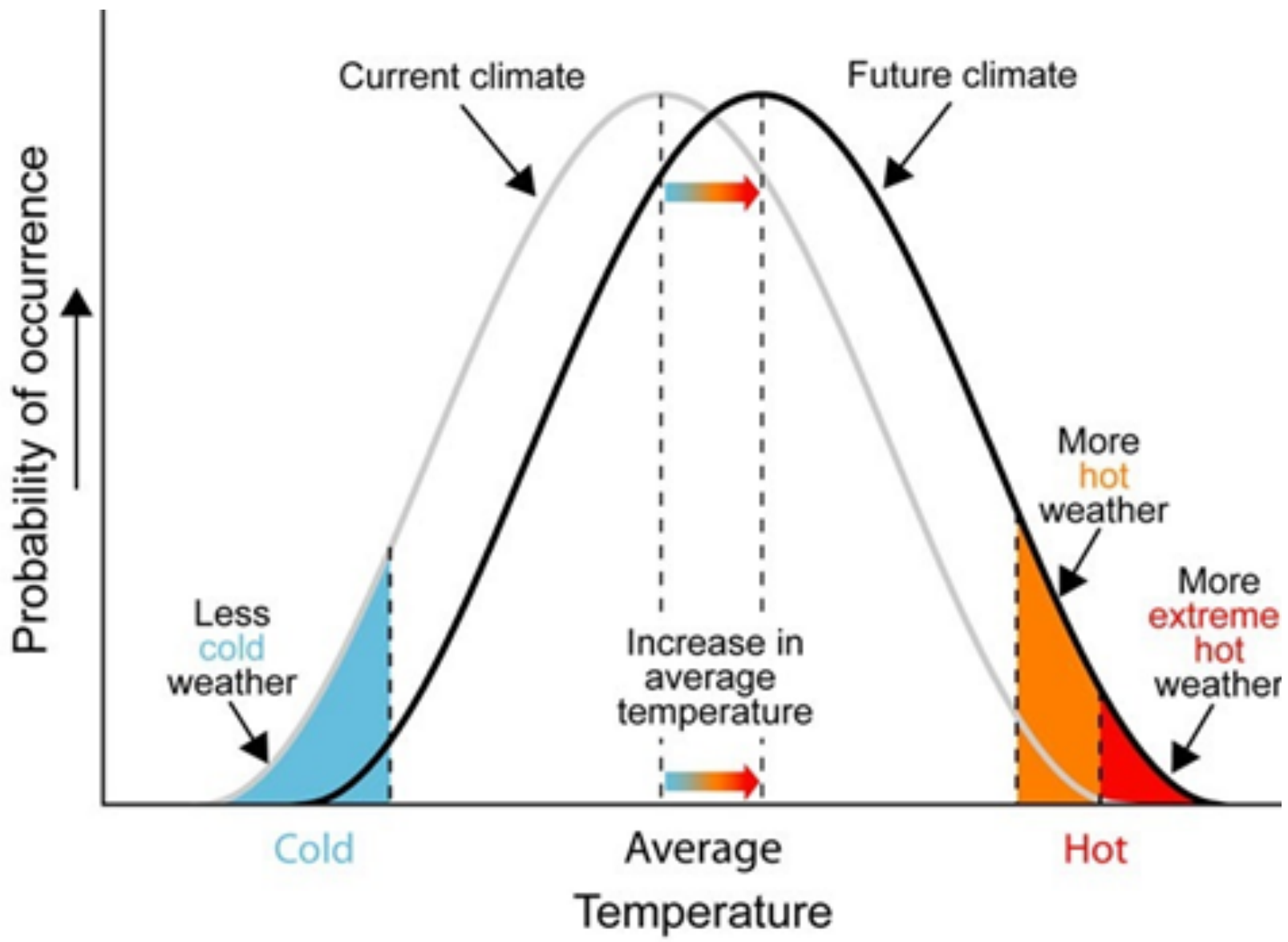
ENSO Teleconnection: JAS Temp



## Nov-Dec-Jan

ENSO Teleconnection: NDJ Temp





# Current Heat Related Products

- Systematically migrating current deterministic outlook to probabilistic form for Days 8-14
- Better and more frequent lead time for potential low probability, but high impact events
- Experimental much above / below normal temperatures outlooks first released in July 2014

