
Identifying Users, Diagnosing Understandability Challenges, and Developing Prototype Solutions for NOAA Climate Prediction Center's Temperature and Precipitation Outlooks

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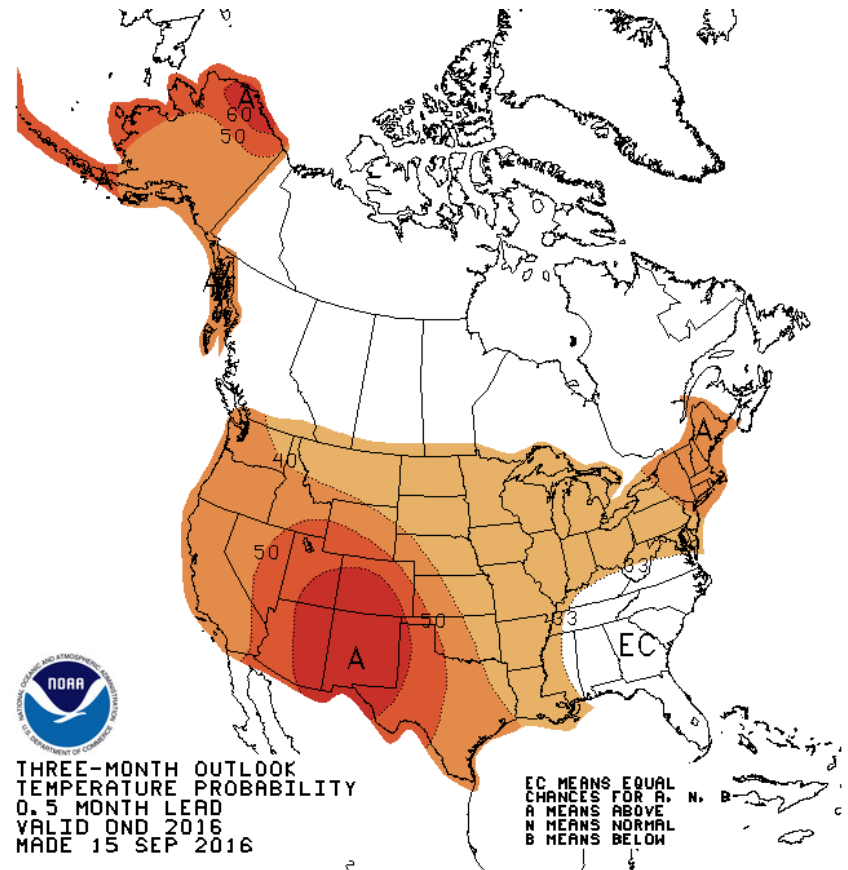
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EARTH SYSTEM SCIENCE INTERDISCIPLINARY CENTER

Background

- Temperature and precipitation outlooks contain significant degrees of uncertainty
- How to best visualize geospatial uncertainty is an open scientific question
- Using decision and visualization science to align user needs and goals with visualization choices



Outline

Key Findings from Phases 3-4

1. Decision Contexts
2. User Characteristics
3. Diagnosis of Understandability Challenges

Next Steps

High-Level Take Home Messages

Diagnosis of understandability challenges:

1. White space outside of US
2. Understanding of normal
3. Clarity and clutter
4. Probability vs. Intensity

Methods

Identifying Participants

- Target end-user spreadsheet (Phase 2)
- References from CPC
- Informants at other entities
- Internet searches
- Snowball sampling
- Volunteers from survey

Survey Methods

- Administered using Qualtrics platform
- Respondents were assigned one of two sets of outlooks containing one of each type of uncertainty representation
- Randomly assigned temperature or precipitation outlooks

Focus Group Methods

- Participants in all 4 sectors
- Interviews were all conducted via web conference
- Online workbook and discussion
- Transcripts of the interviews were sent to the interviewees via email

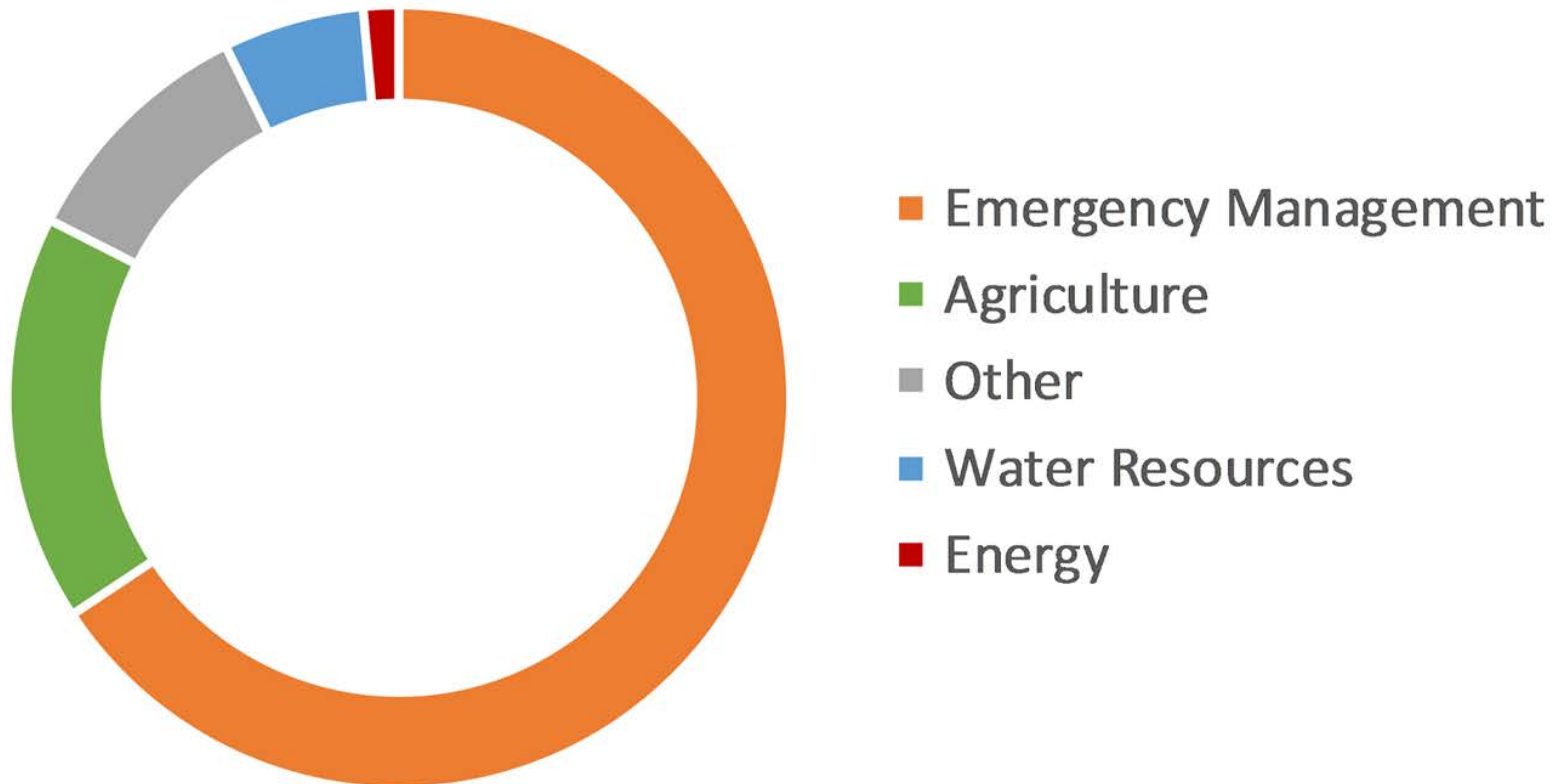
Decision Contexts

Types of Decisions

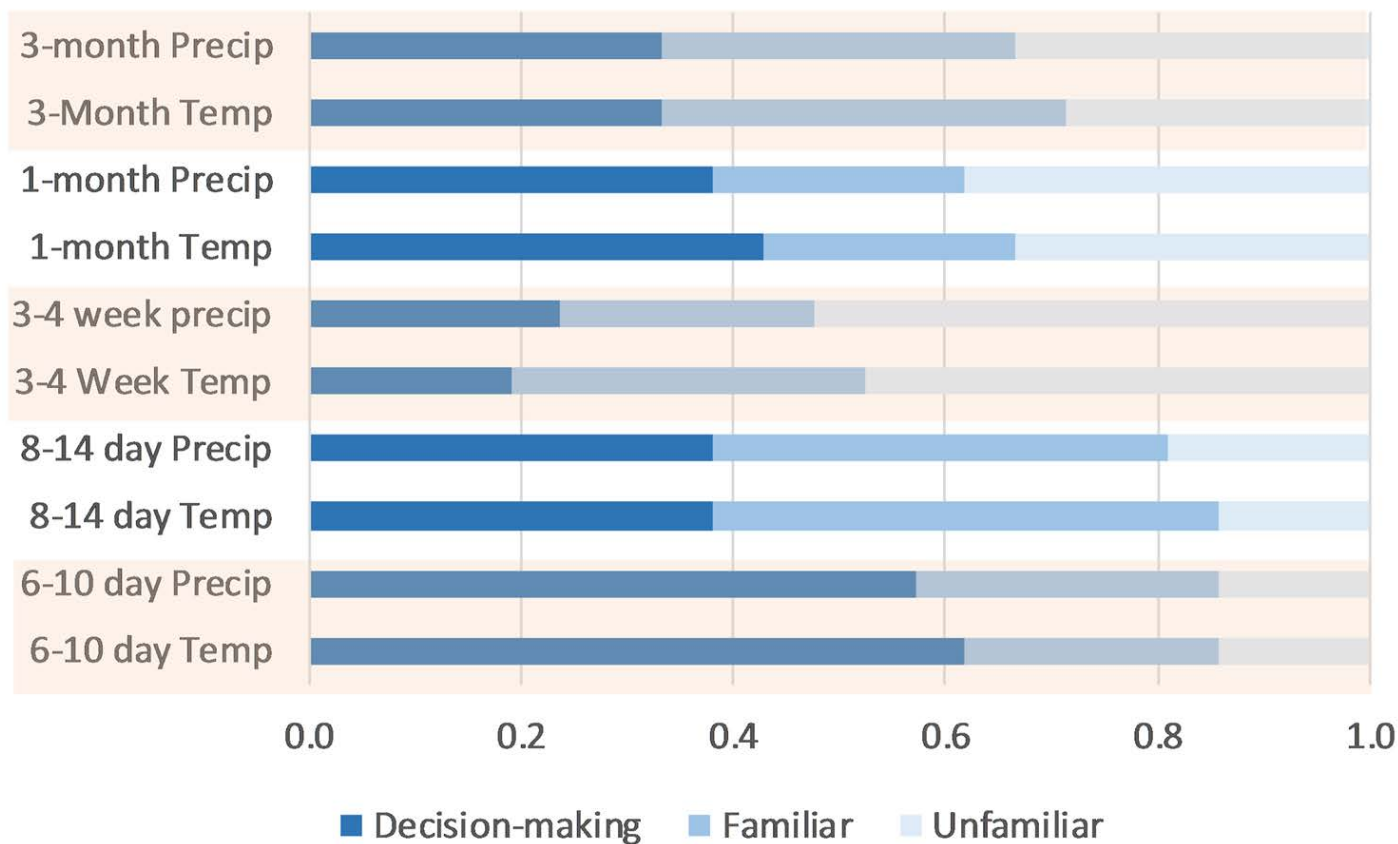


User Characteristics

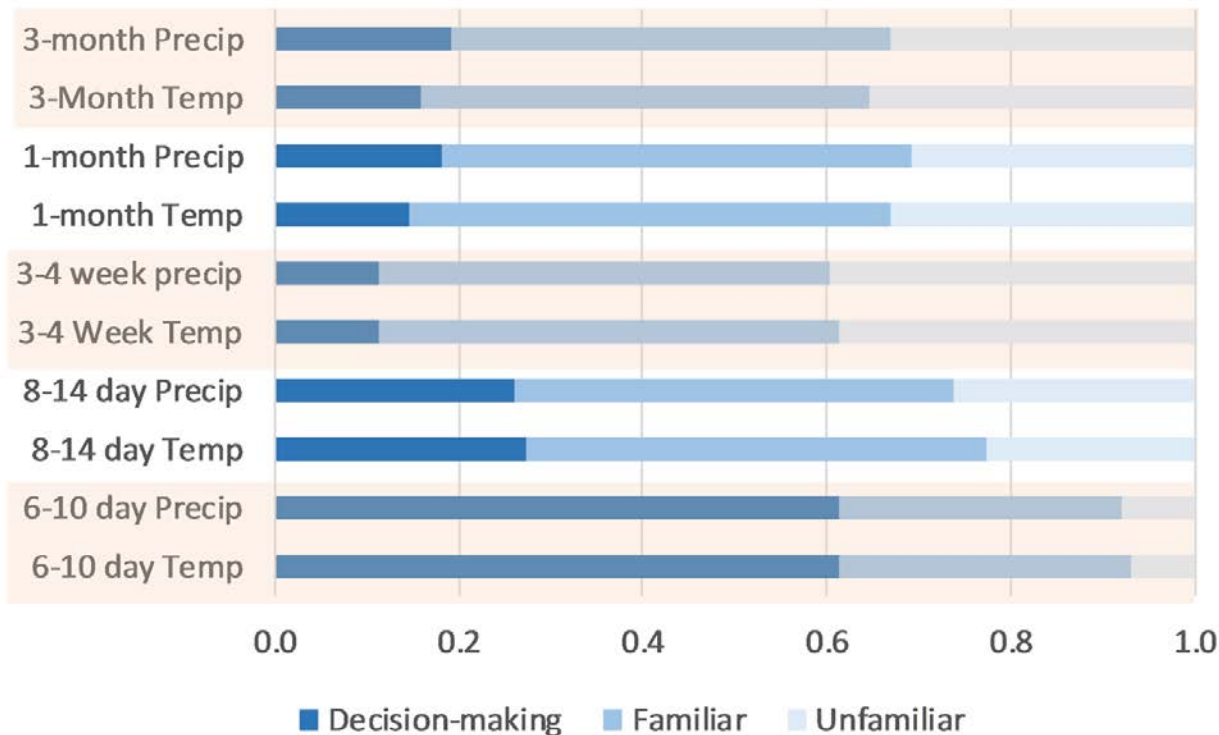
Survey Demographics



Familiarity and Use - Agriculture



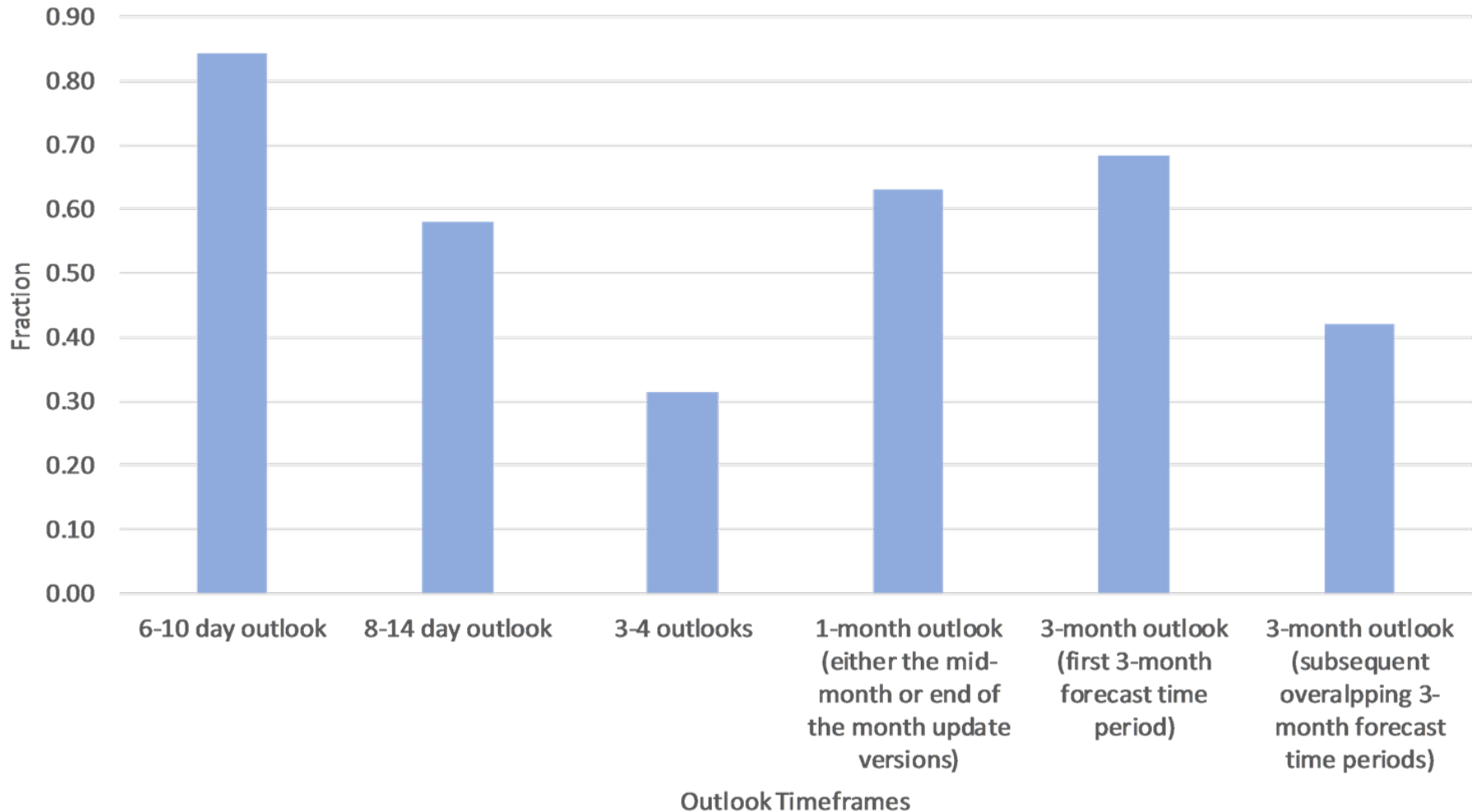
Familiarity and Use - Emergency Management



Decision-making

	Ag	EM
Mean	0.39	0.27
St.dev.	0.13	0.19

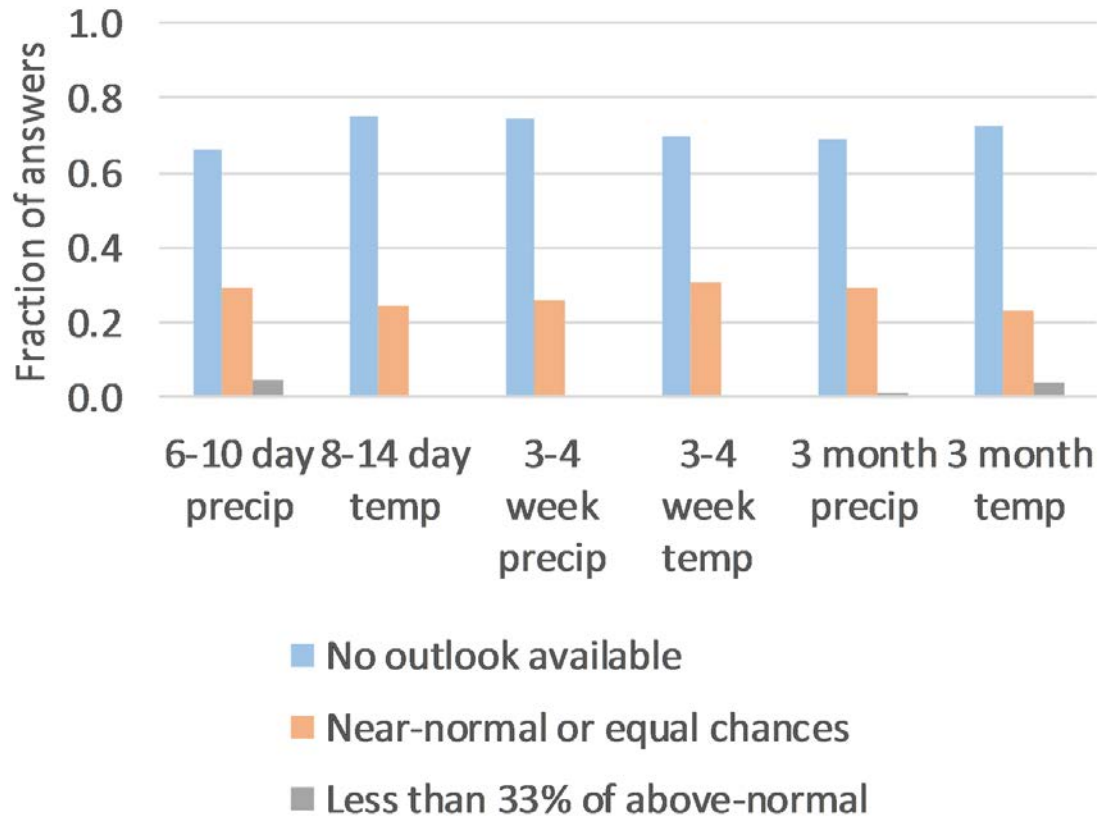
Outlook Timeframes



Diagnosis of Understandability Challenges

White Space Outside of U.S.

White Space Outside of U.S.



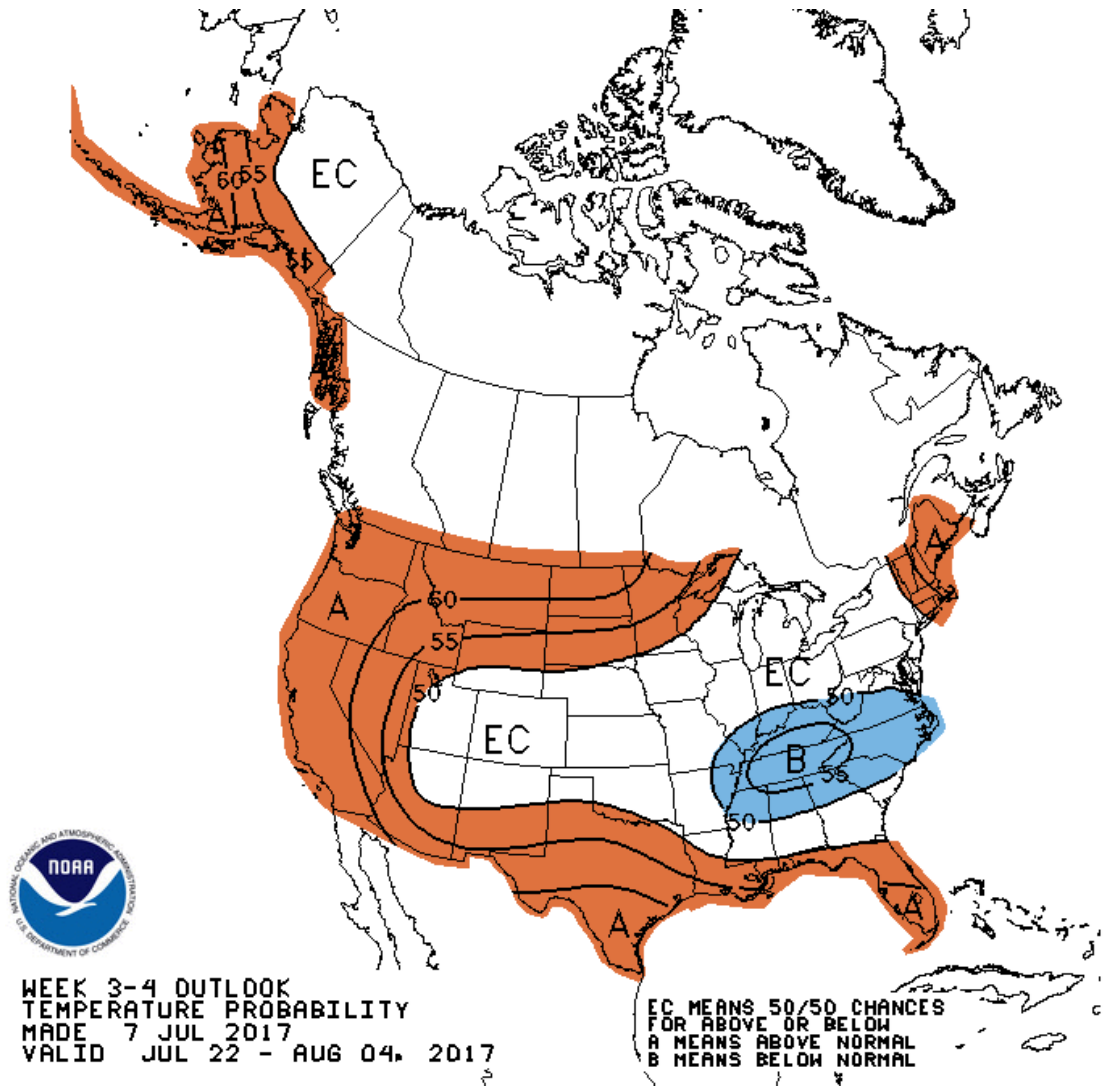
What does white space outside of the U.S. mean?

White Space Outside of U.S.

Useful areas are
outside of U.S.

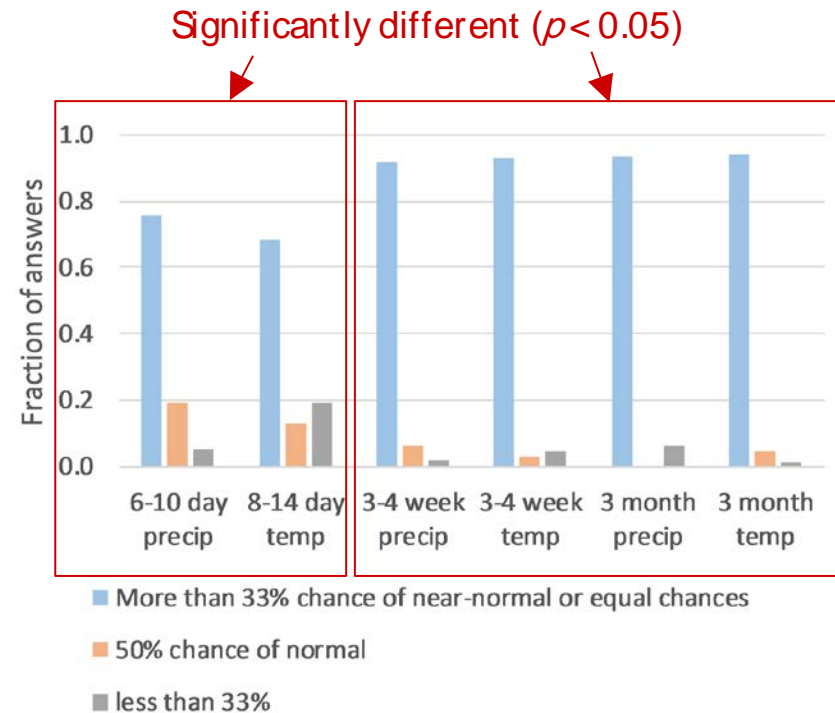
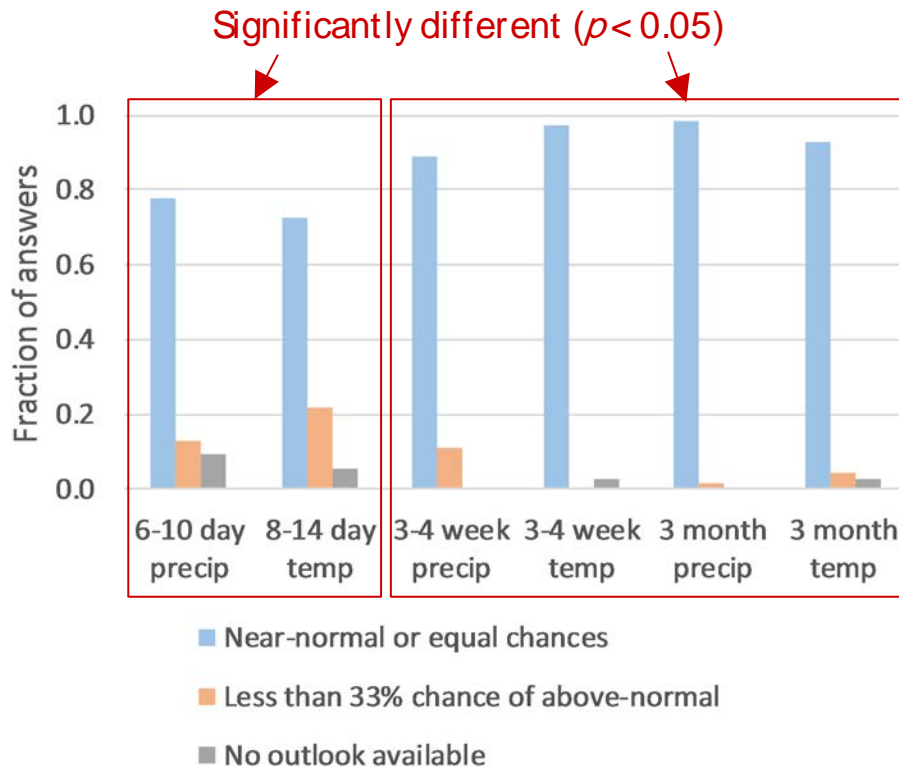
V.S.

Remove Canada



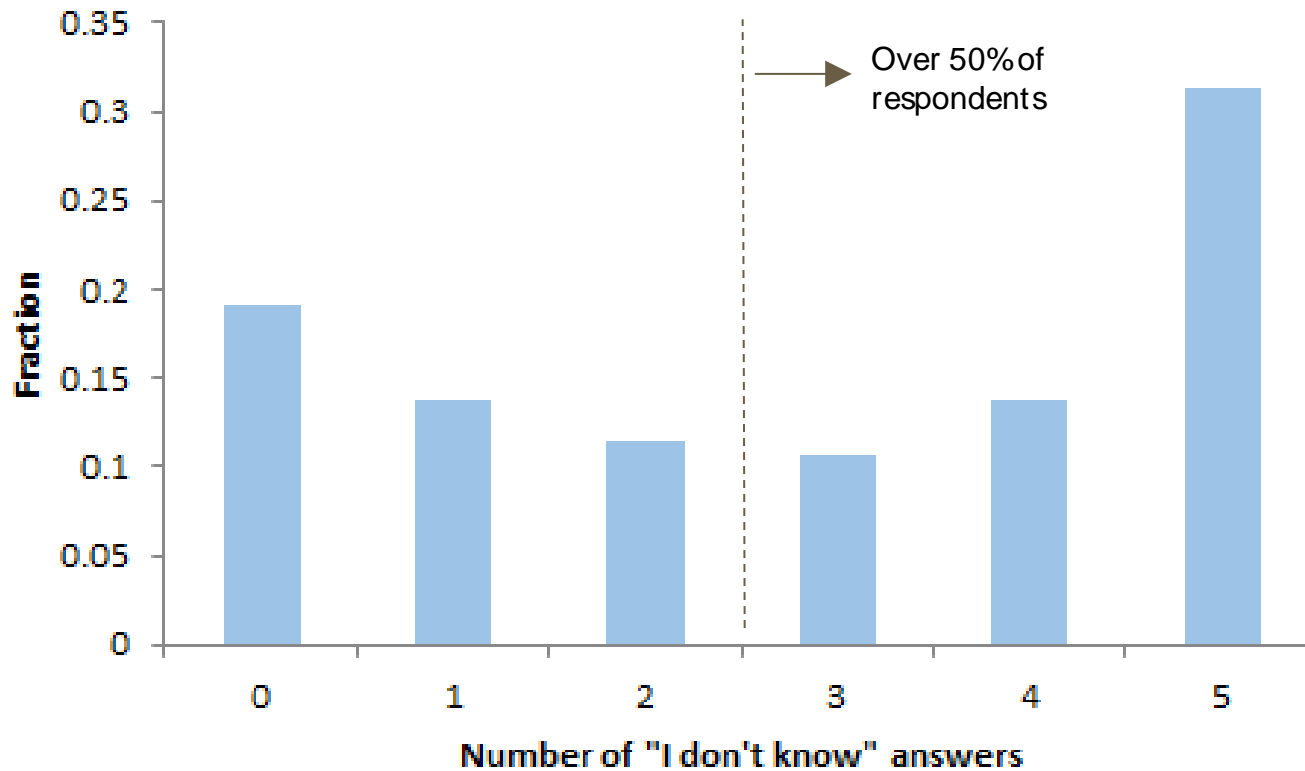
Understanding of Normal

White Space Inside of U.S.



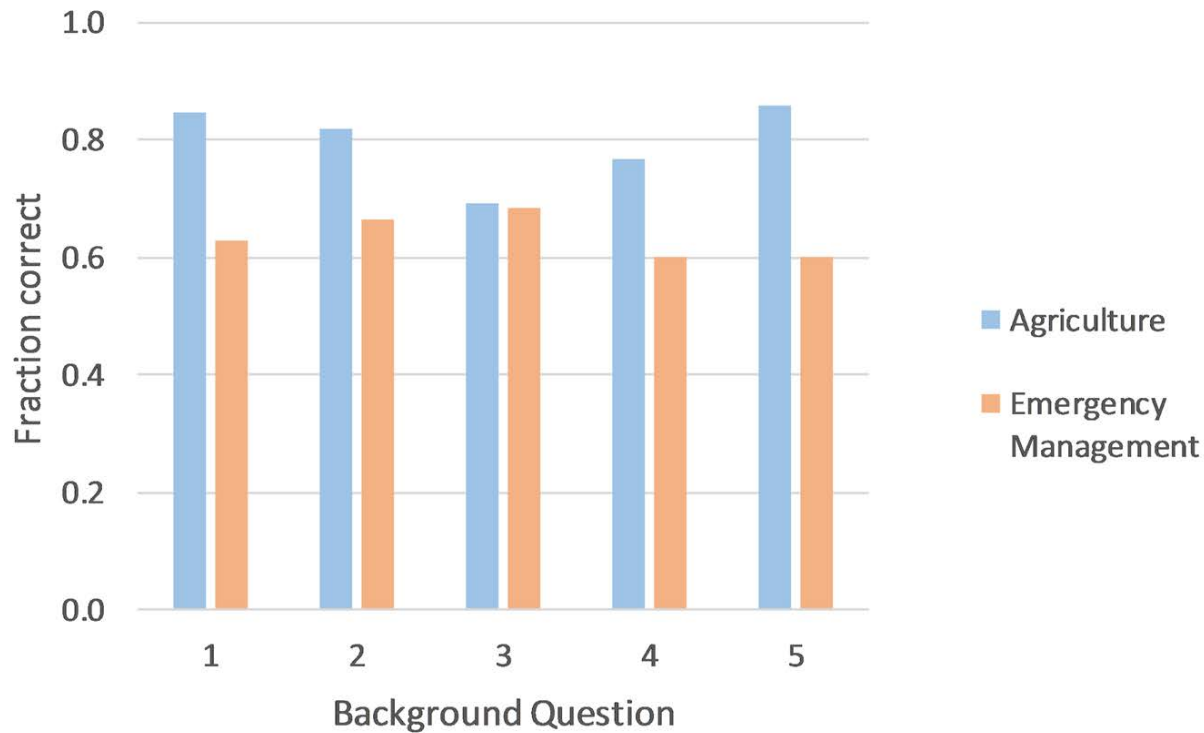
What does white space in the U.S mean?(left); Interpreting white space for a specific state on the map (right)

Background Knowledge



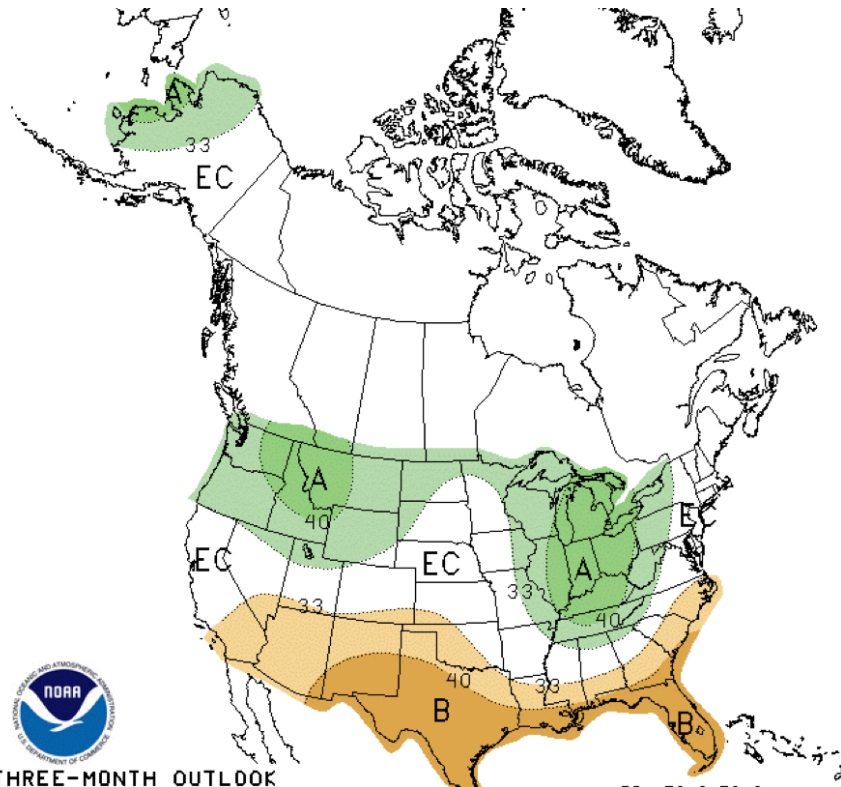
Agriculture and Emergency Management

Background Knowledge



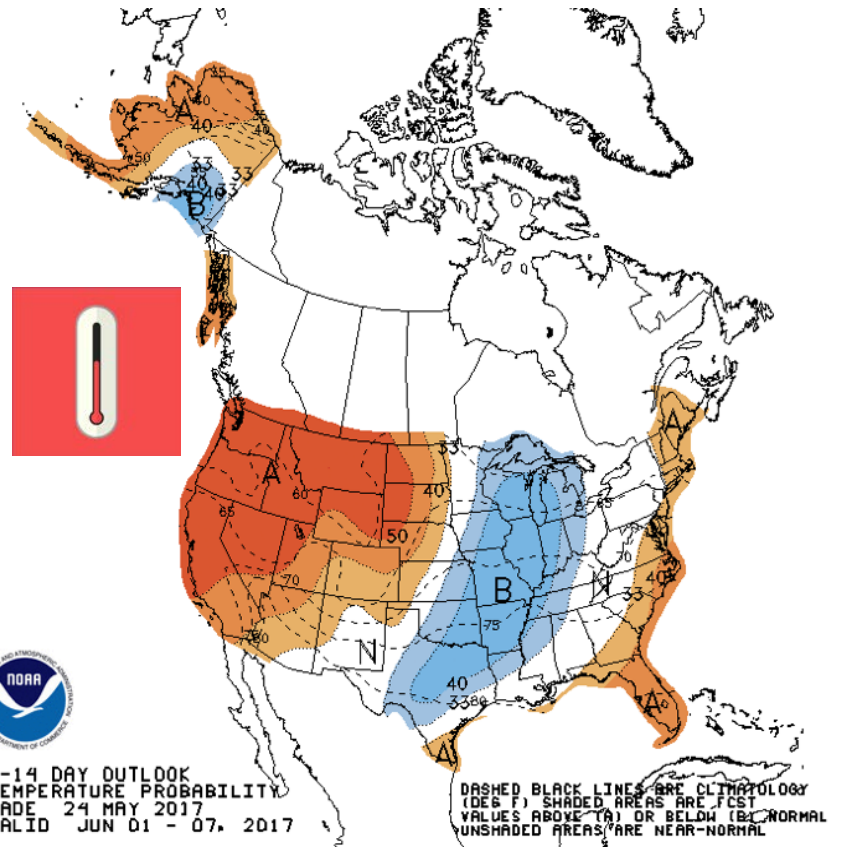
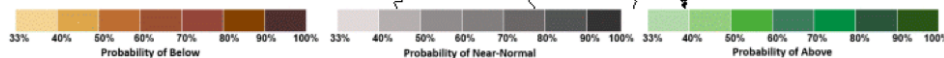
Background question answered correctly, not considering “I don’t know” as an incorrect answer”

White Space Inside of U.S.



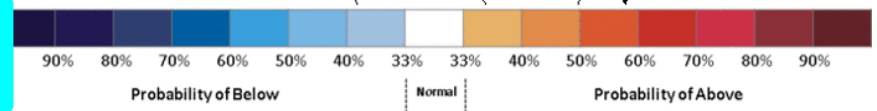
THREE-MONTH OUTLOOK
PRECIPITATION PROBABILITY
0.5 MONTH LEAD
VALID JFM 2017
MADE 15 DEC 2016

EC MEANS EQUAL
CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW



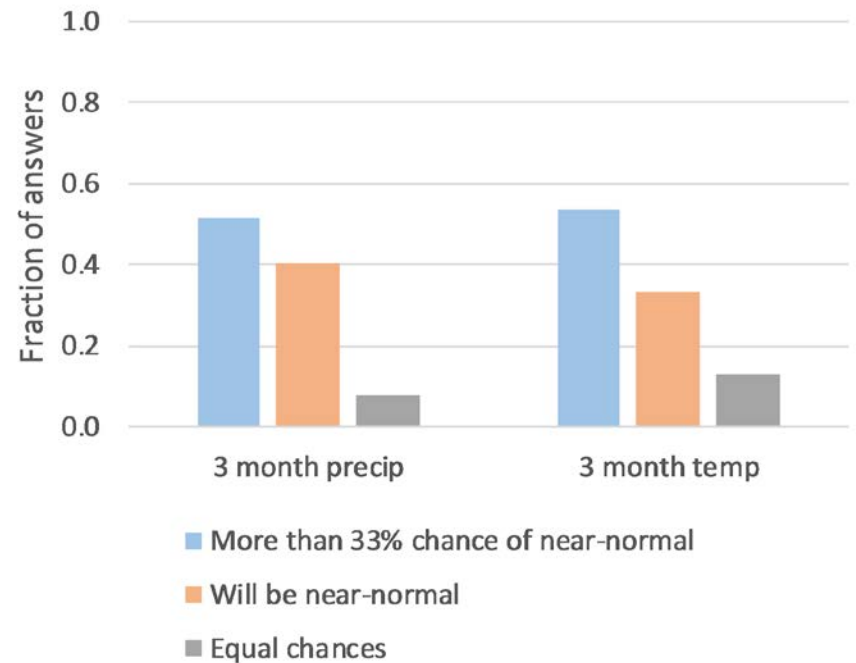
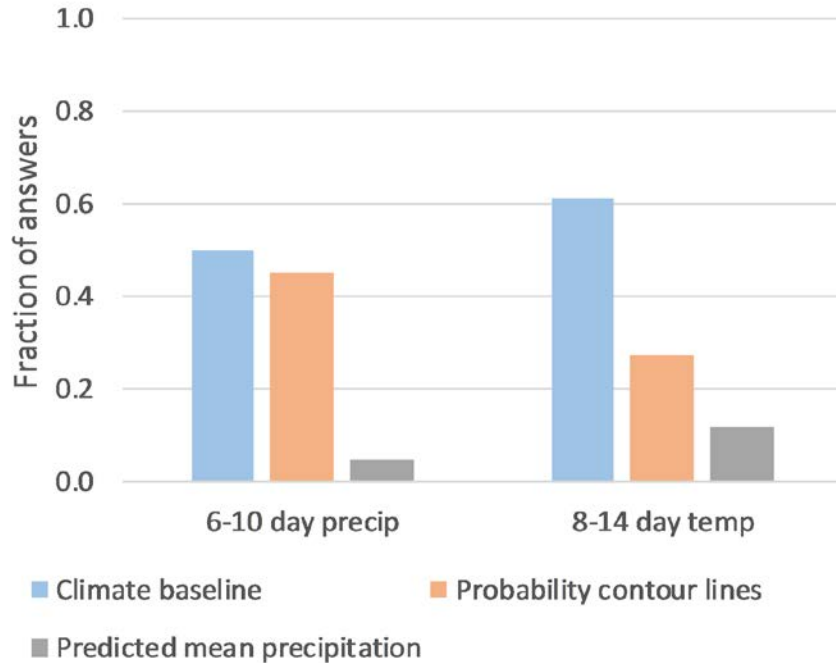
8-14 DAY OUTLOOK
TEMPERATURE PROBABILITY
MADE 24 MAY 2017
VALID JUN 01 - 07, 2017

DASHED BLACK LINES ARE CLIMATOLOGY
(DEG F) SHADED AREAS ARE FCST
VALUES ABOVE (A) OR BELOW (B) NORMAL
UNSHADED AREAS ARE NEAR-NORMAL



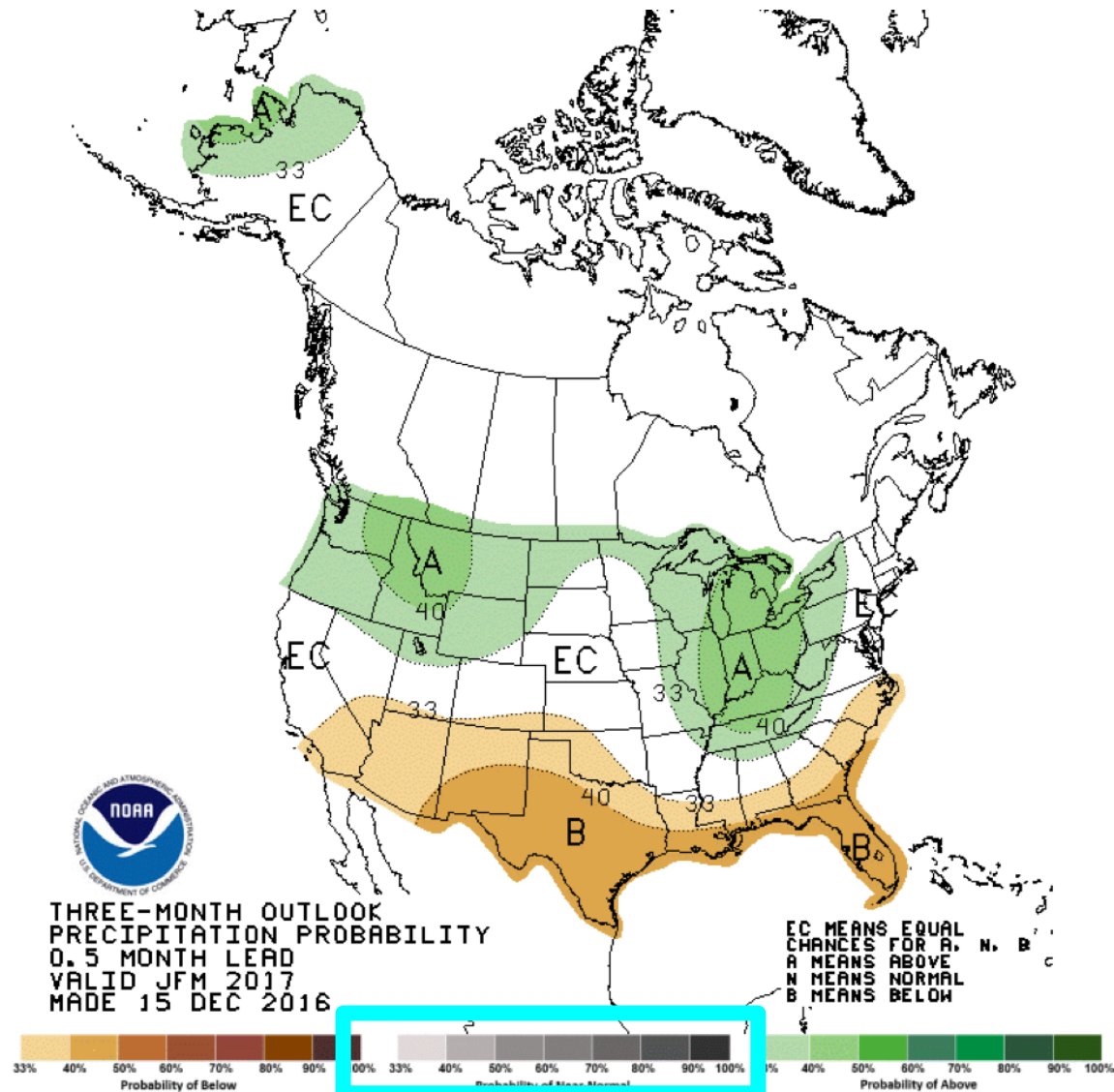
Clarity and Clutter

Dashed Lines and Contour Lines

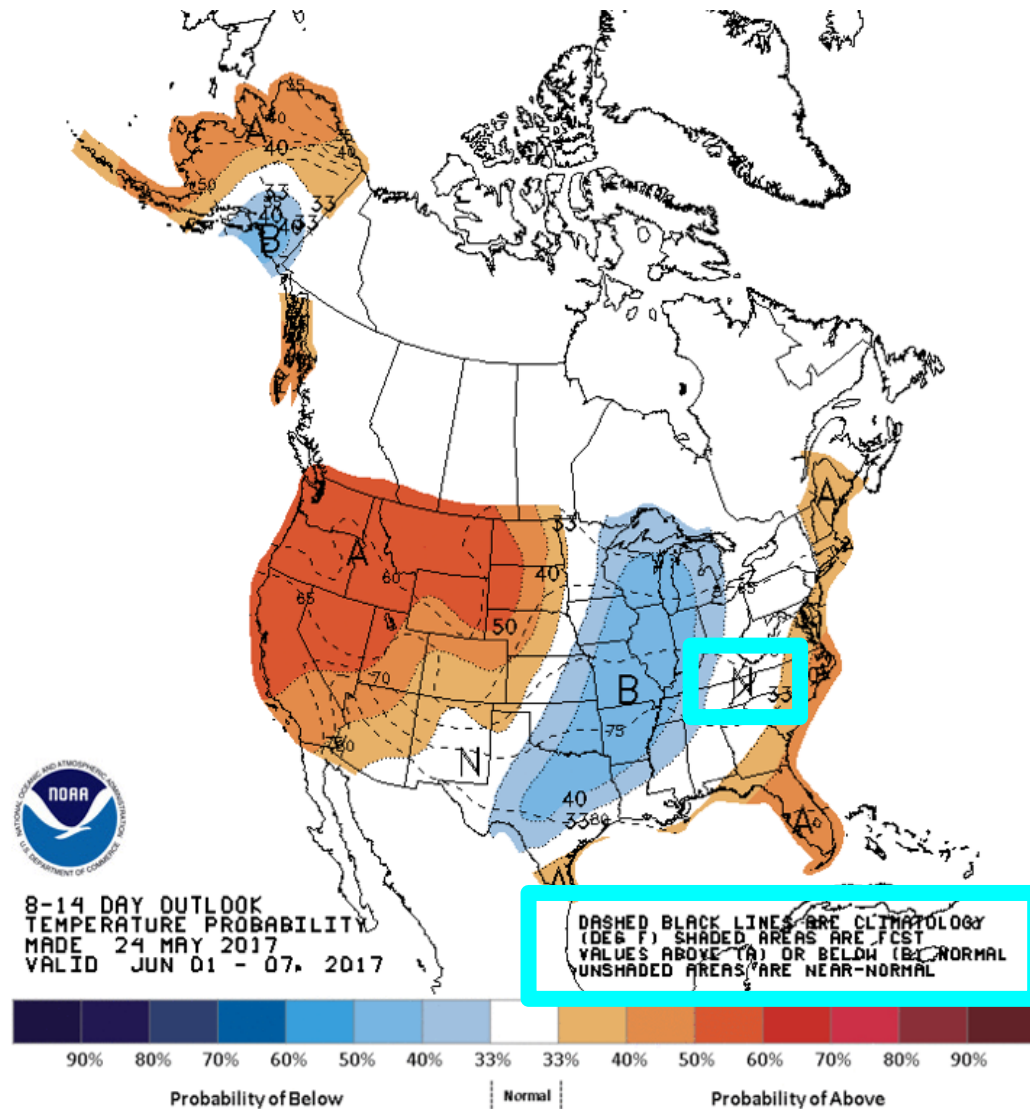


What do dashed lines mean?(left); What does grey shading mean?(right)

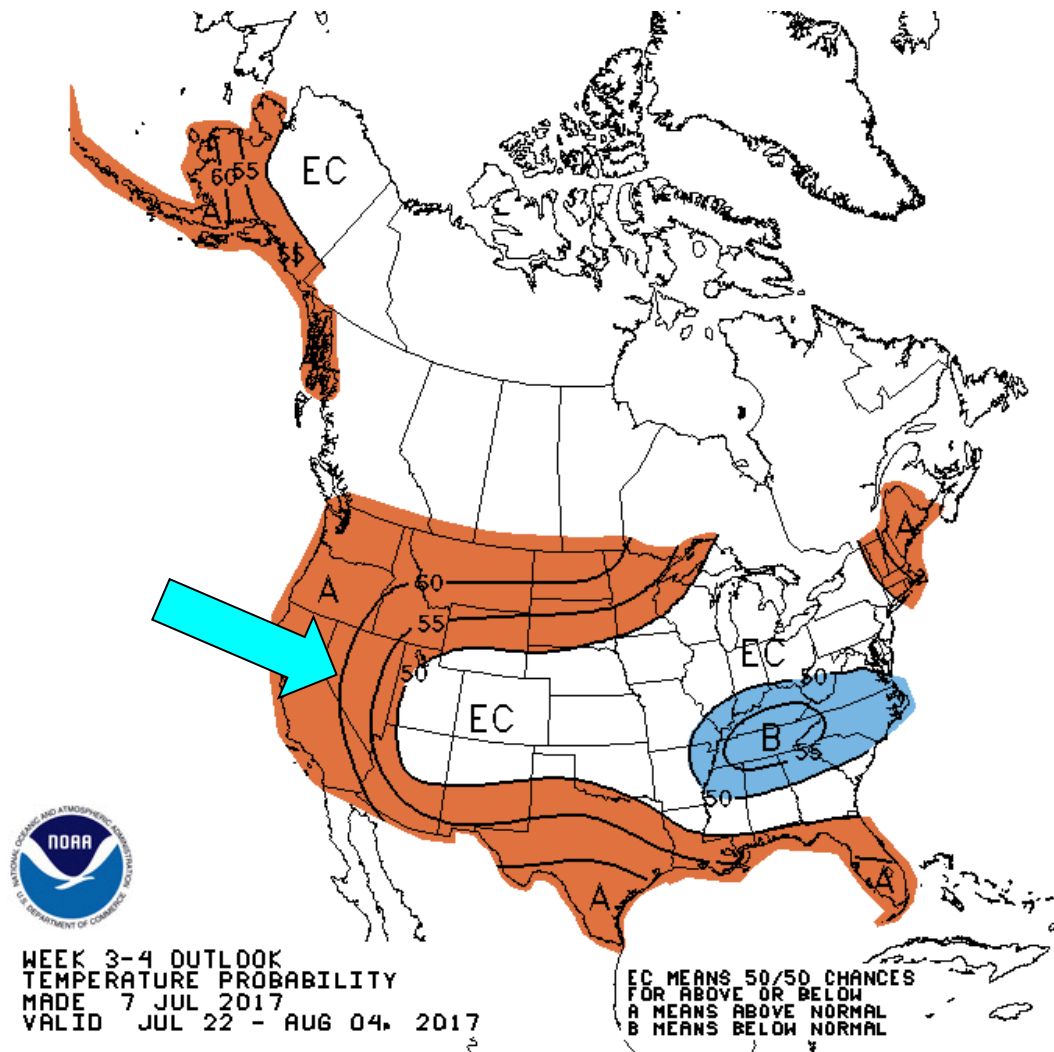
Clarity and Clutter



Clarity and Clutter

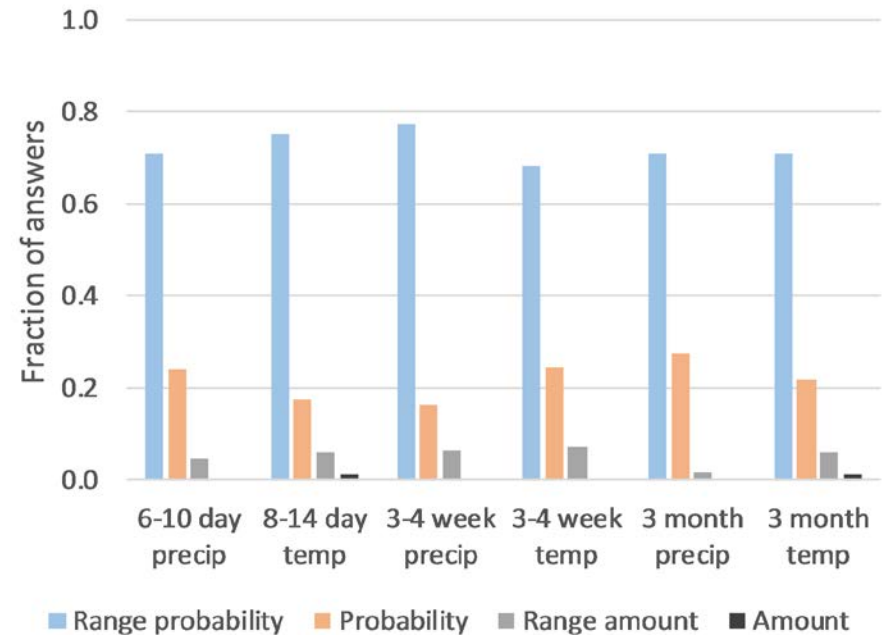
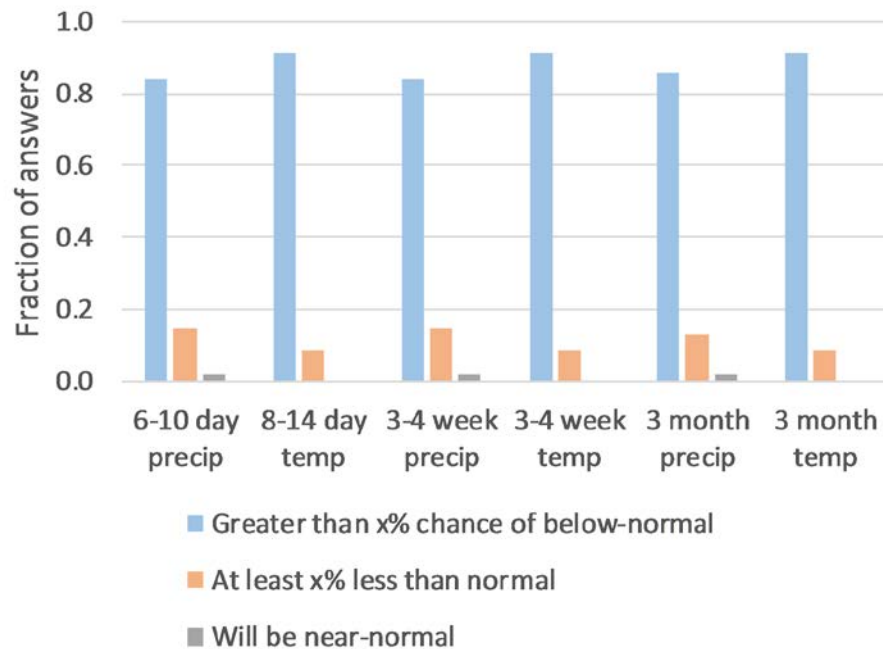


Clarity and Clutter



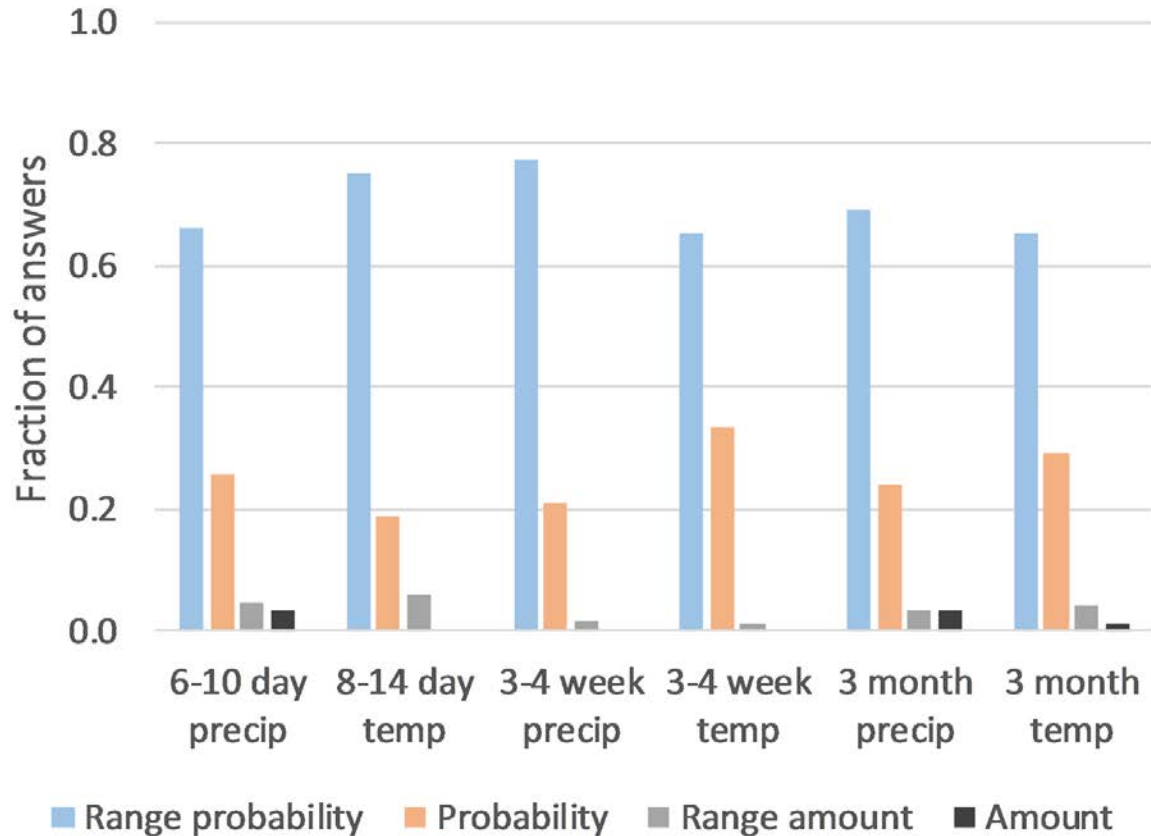
Probability vs. Intensity

Probability vs. Intensity for Below-normal



What does brown (for precipitation) or blue (for temperature) shading mean? (left); Interpreting brown or blue shading for a specific state on the map (right)

Probability vs. Intensity for Above-normal



Interpreting green or red shading for a specific state on the map

Next Steps

Phases 5 and 6

- Redesigning outlooks for target audiences
- Testing of effectiveness of climate outlooks

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