

Making Decisions About Extreme Precipitation: How Practitioners Use Sub-seasonal to Seasonal Extreme Precipitation Forecasts and Tools



How do we develop informed and actionable science related to sub-seasonal to seasonal (S2S) extreme precipitation events?

- Research Priorities Workshop (2018)
- Product Definition Workshop (2021)
- Testbed Activity (end of the project)

Engaging with **water managers, tribal environmental professionals and emergency managers** from across the United States

Workshop Sessions

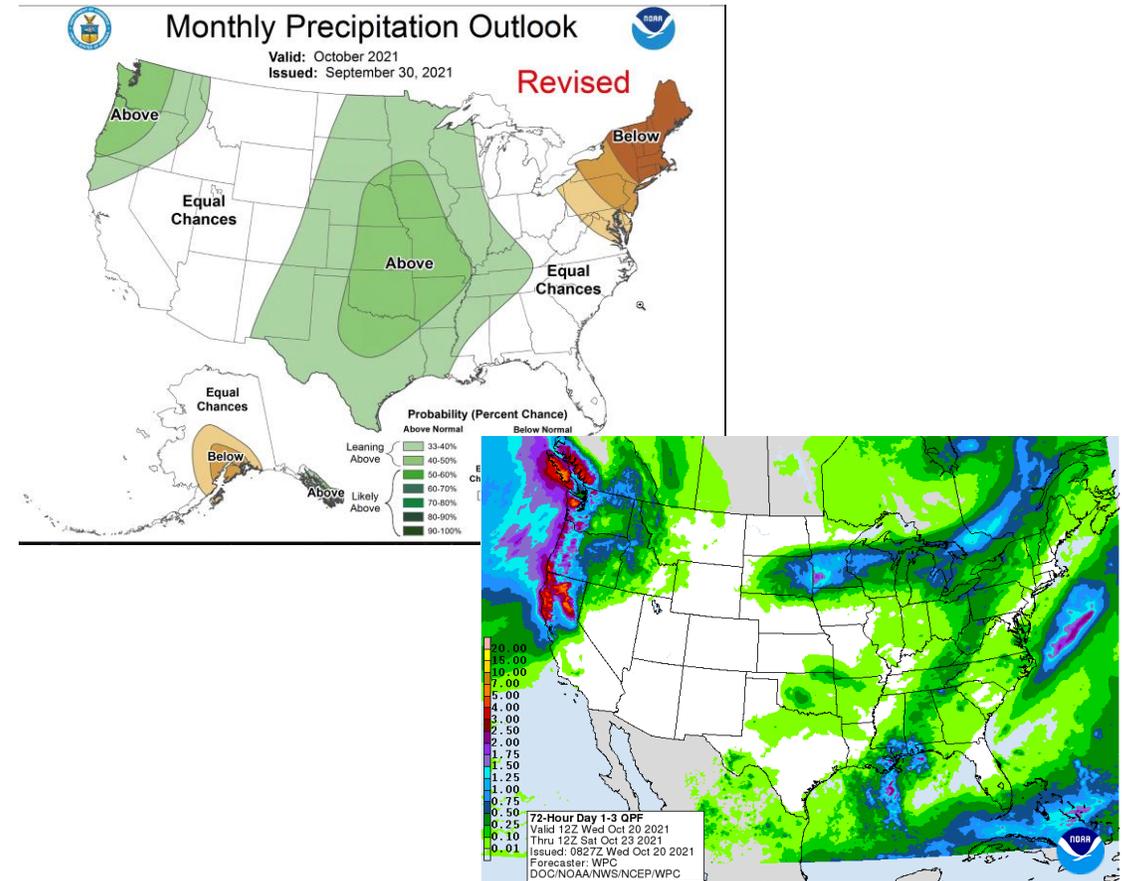
Session 2 – Using Existing Forecast Products

Session Goal

- Understand which forecast products practitioners already use for decision-making

Key Takeaway

- No single product is most useful
- Practitioners want localized information
- Relationships with forecasters are important



Workshop Sessions

Session 3 – Interpreting New PRES²iP Tools

Session Goal

- Understand how participants interpret existing PRES²iP educational products

Key Takeaway

- Including practitioners in developing educational and forecast products is critical
- When communicating our research outputs, we need to do so in language that is easy to understand



DEFINING A 14-DAY EXTREME

Between 1980 and 2019, there were 14 billion-dollar extreme precipitation-related disasters over periods longer than 14 days. But how do we define extreme over 14+ days?

- We analyze events in "windows": 14-day blocks beginning on each calendar day.
- Thresholds for accumulation and duration are developed for each window.
- Spatial points meeting criteria grouped together to form event polygons.

Over an event window, a point must experience total precipitation greater than the 99th percentile. We are also building databases with other percentiles, such as the 95th. The point must also have at least 7 days of above normal daily precipitation. An algorithm to group points meeting both criteria results in an extreme event polygon (see right). Polygons are kept if area exceeds 200,000 km².



To see a list of events with corresponding images (like above) along with quick stats, see <http://pres2ip.com/extreme-event-tables>.



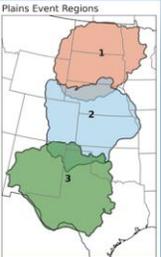
Database v1.0 spans 1915 – 2018 and events were grouped into clusters based on geographic location.



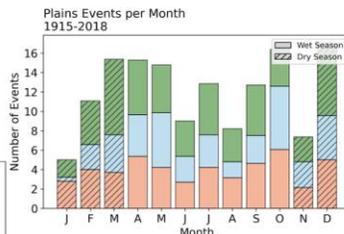
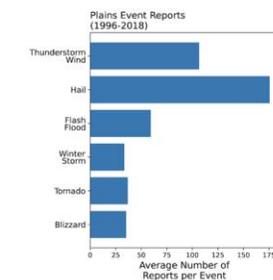
14-DAY PRECIPITATION EVENTS IN PLAINS

There are three event regions within the Plains, seen to the right. How these regions are made and how we define the events can be found in the factsheet "Defining an Extreme Event."

- There are 145 events in the Plains from 1915 to 2018, with 48 events in region 1, 49 events in region 2 and 56 events in region 3
- Events have occurred all year, with a minimum within the winter months (DJF) for regions 1 and 2.
- Typical storm reports include convective reports such as Flash Flood, Flood, Hail, and Thunderstorm Wind; as well as cold event storm reports such as Heavy Snow and Blizzard.



Below, the average number of storm reports for a Plains event from 1996 to 2018 are seen. "Hail", "Thunderstorm Wind" and "Flash Flood" are the most frequent reports seen.



Above, all events within the Plains are counted, based on month, from 1915 to 2018. The typical wet season of the Plains is from April to October. Yet, 14 day precipitation events can happen throughout the year.



Workshop Sessions

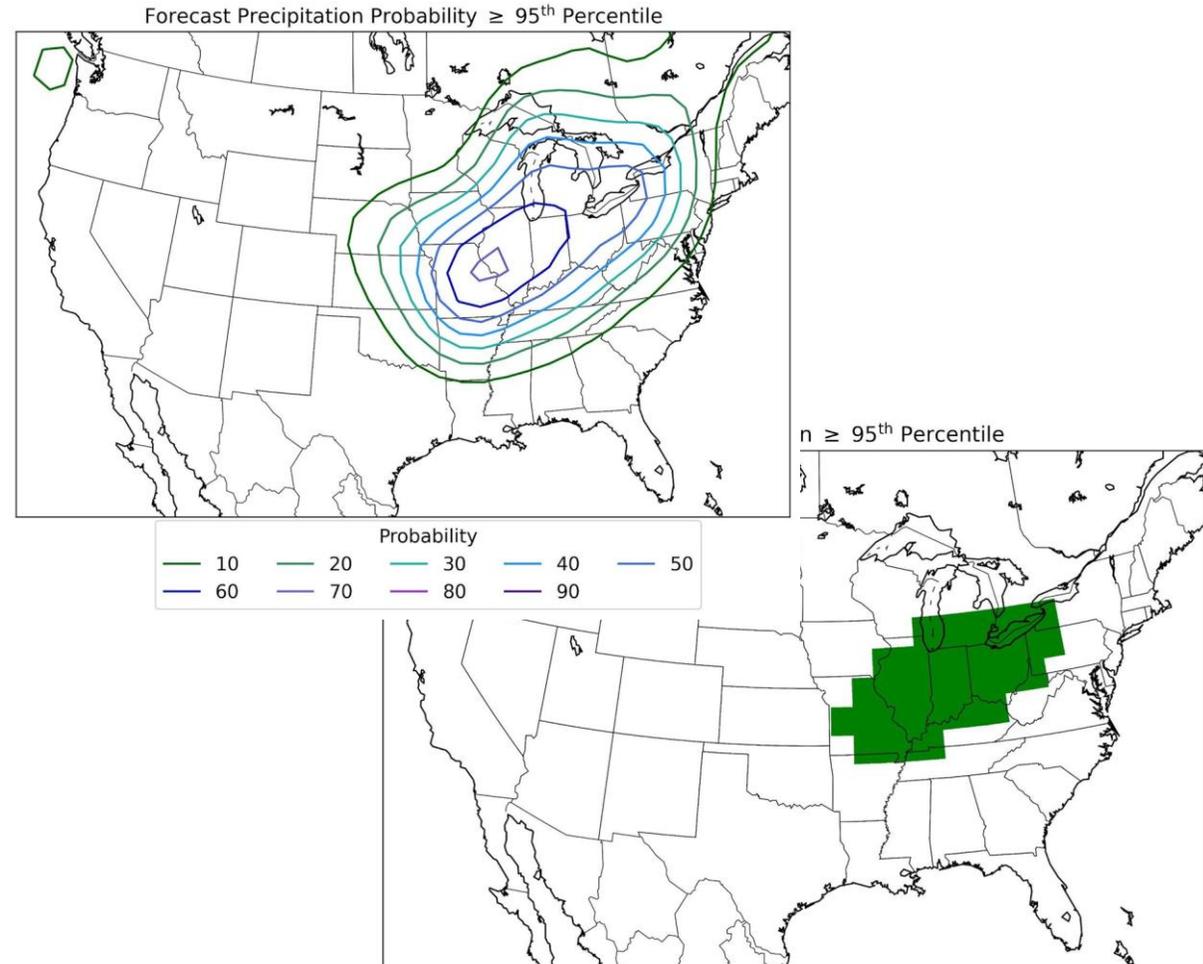
Session 4 – Forecast Skill and Uncertainty

Session Goal

- Discuss forecast skill and uncertainty associated with S2S forecasts

Key Takeaway

- Practitioners aren't very familiar with the S2S time scale but would like to learn how to apply and use S2S forecasts





Next Steps

- Synthesize workshop takeaways and integrate into ongoing research
- Work with operational partners as we move towards developing forecast products
- Third workshop – the *Testbed Activity* – planned for the end of the 5-year project

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