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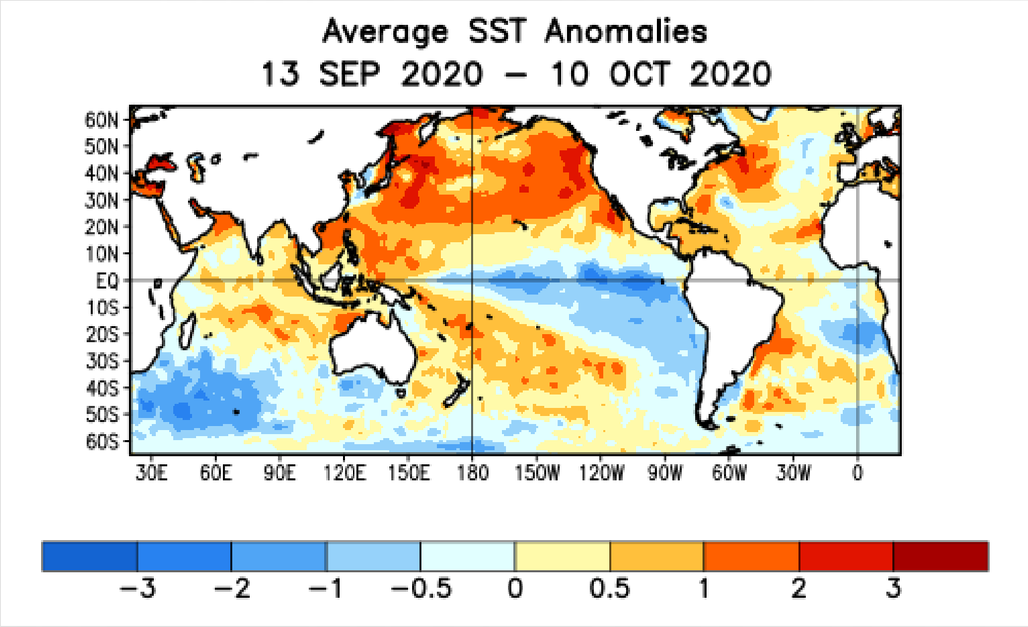
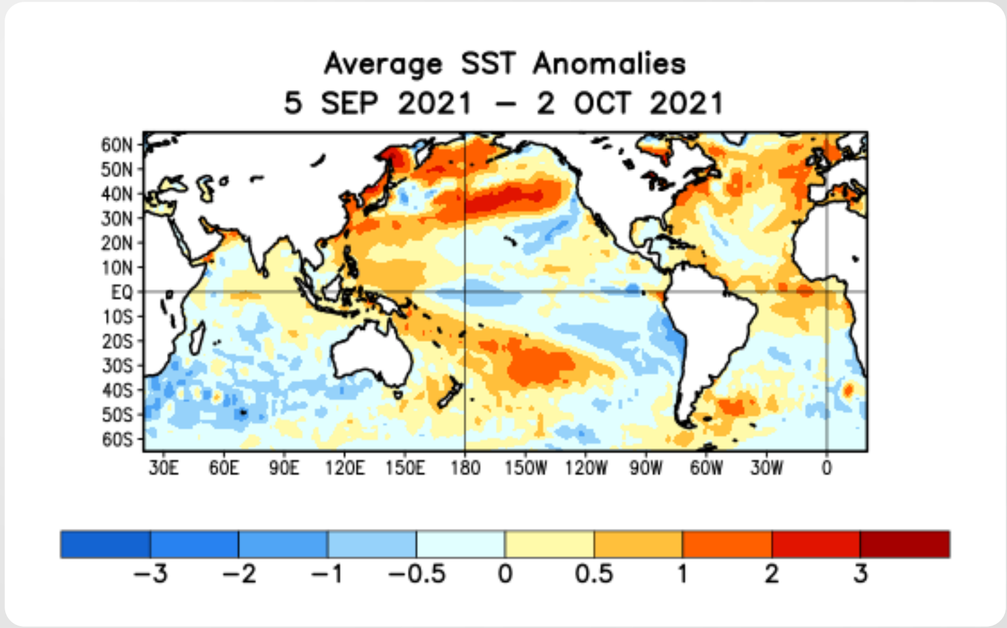
Seasonal to Interannual Prediction in a Dynamic Climate

May 17, 2022



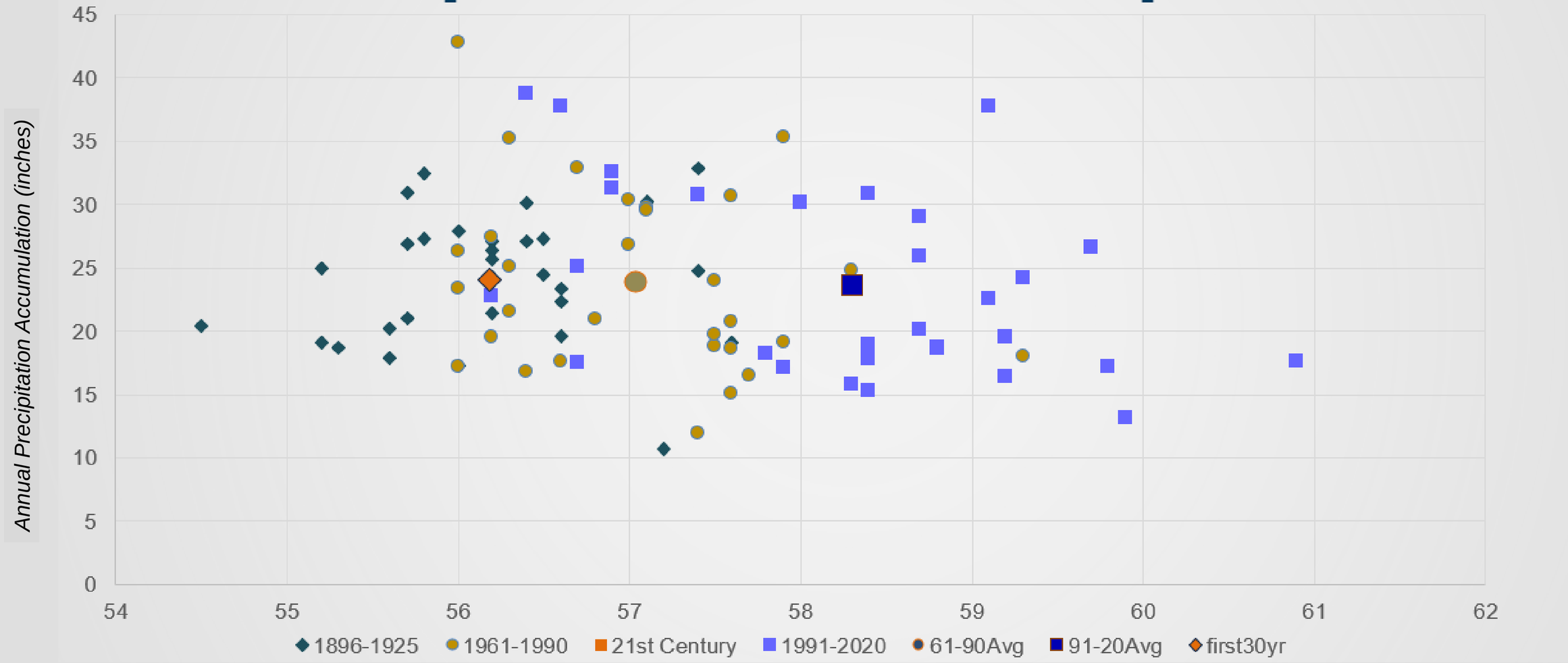


Michael L. Anderson, State Climatologist

Talk Overview

- Seasonal prediction with average and increasing variability
- Geophysical processes and interactions influencing seasonal prediction
- A framework for forecasting from weather to climate and from climate to weather
- To Do List

CA Temperature and Precipitation Dynamic Climate Perspective



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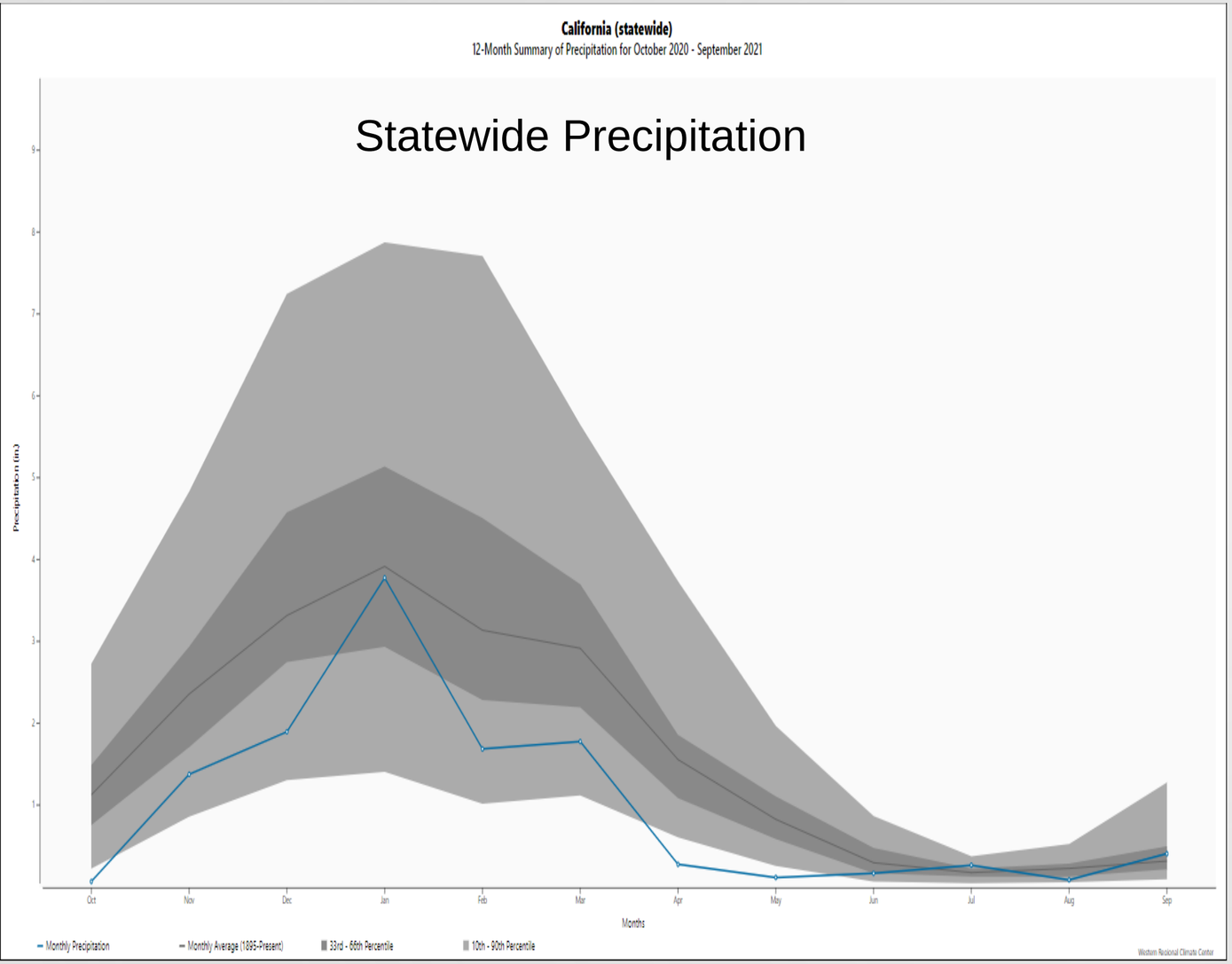
Intra-annual Variability



Gray – within middle 80% of distribution
Dark Gray – middle third of the distribution

Need: S2S prediction to note anomaly, extreme, or record-setting

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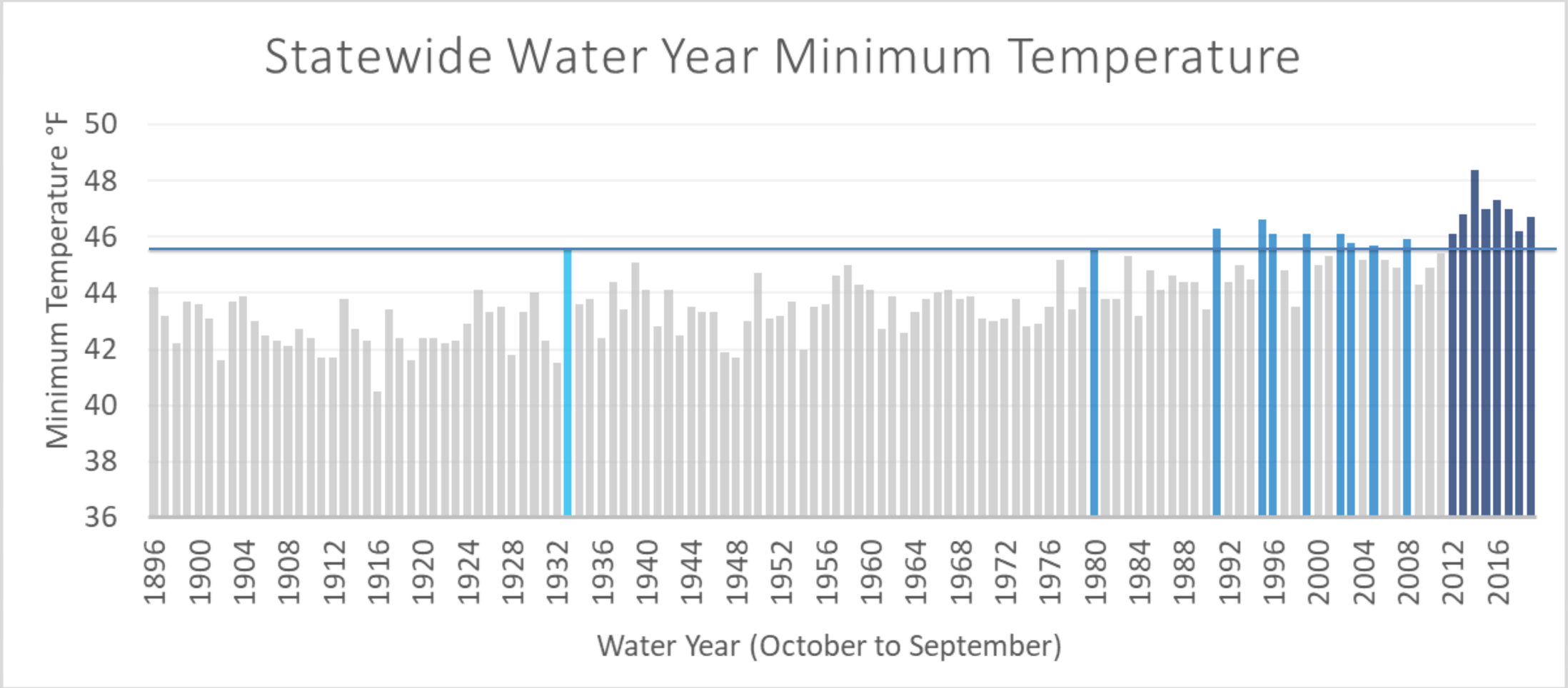
Precipitation to Runoff to Atmospheric Demand

From Extreme to Common



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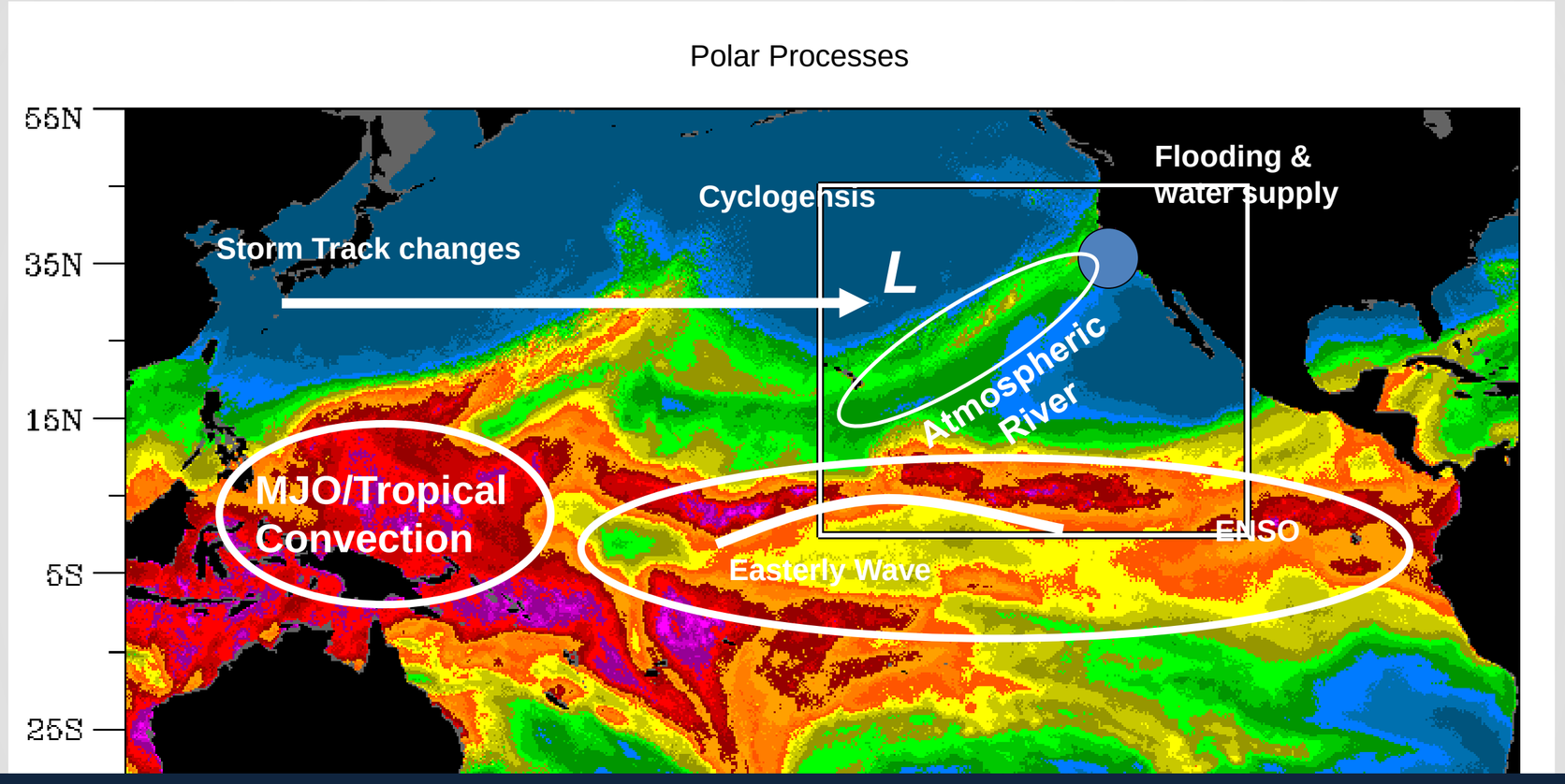
Key Phenomena Affecting California Water Supply/Flooding:



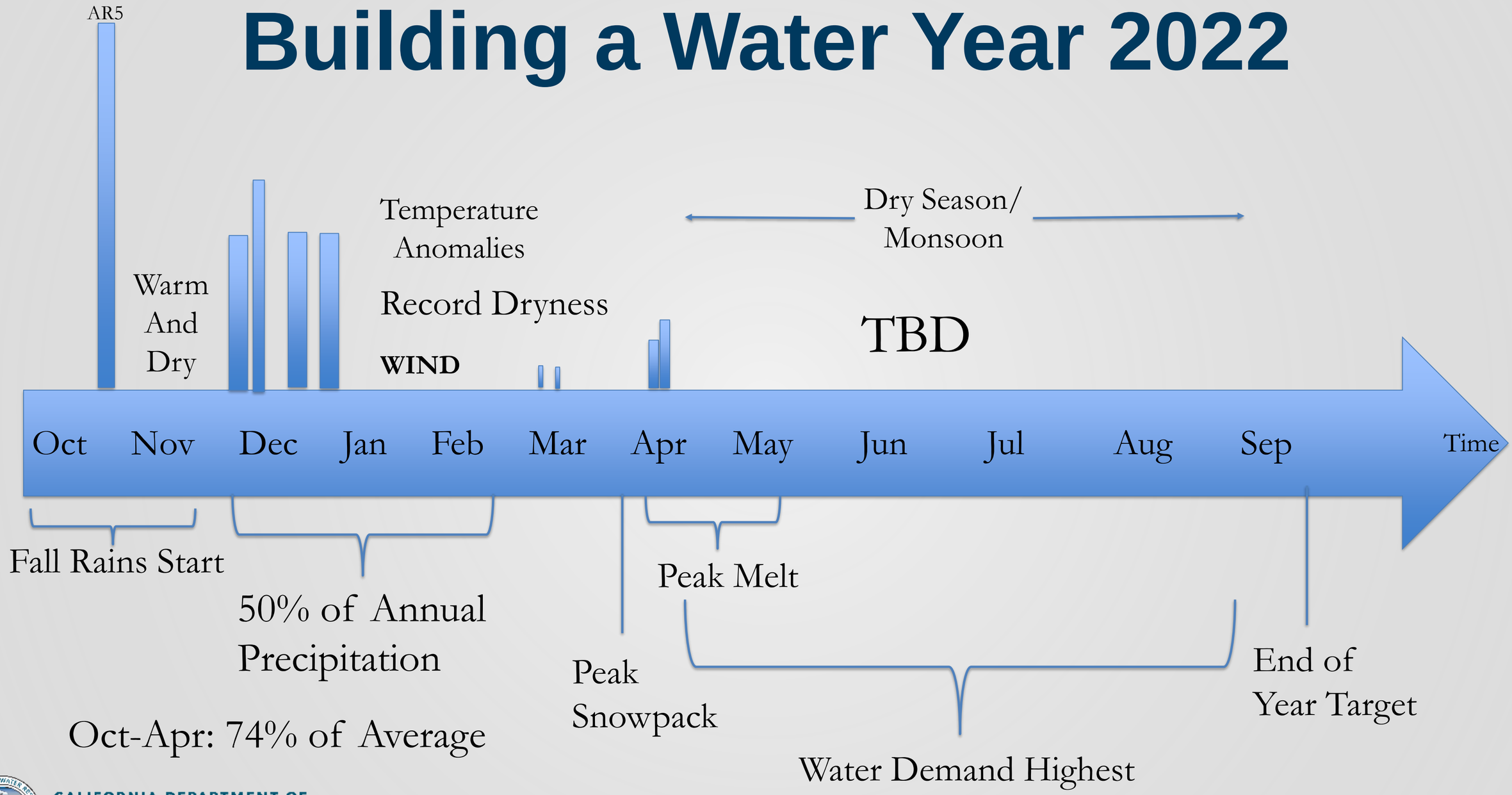
The alignment of key physical processes operating and interacting on different space and time scales that will change with climate change impact the timing, pace and scale of atmospheric river events.

Forecasting the Water Year

- Fall (October/November)
  - Precipitation Onset
  - Temperature Anomaly, Extreme or Record
  - Soil Moisture State with Snowpack Initiation
- Winter (December/January/February)
  - Wet/Dry
  - Notable Anomalies
- Spring (March/April/May)
  - Late-Season Bailout or Early Shutoff?
  - Peak Snowpack Timing and Magnitude
- Summer (June/July/August/September)
  - Drying Pace and Scale
  - Heat Events
  - Tropical Activity
- Multi-Year Prediction – What about next year?

Climate Change: How much different will the next decade be?

Building a Water Year 2022



Oct-Apr: 74% of Average

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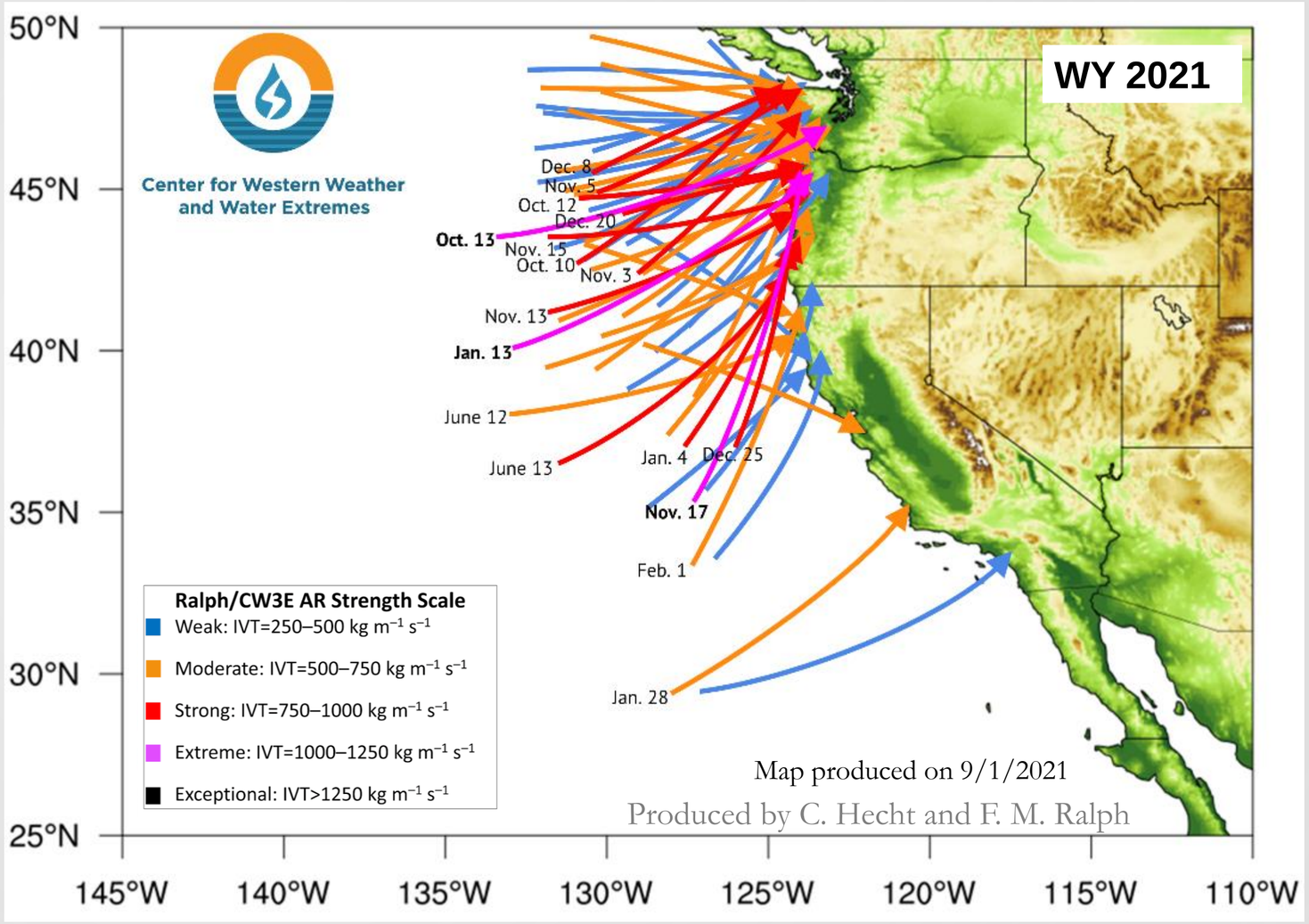
Water Year 2021 Landfalling Atmospheric Rivers: Through August

AR Strength	AR Count
Weak	23
Moderate	24
Strong	12
Extreme	3
Exceptional	0

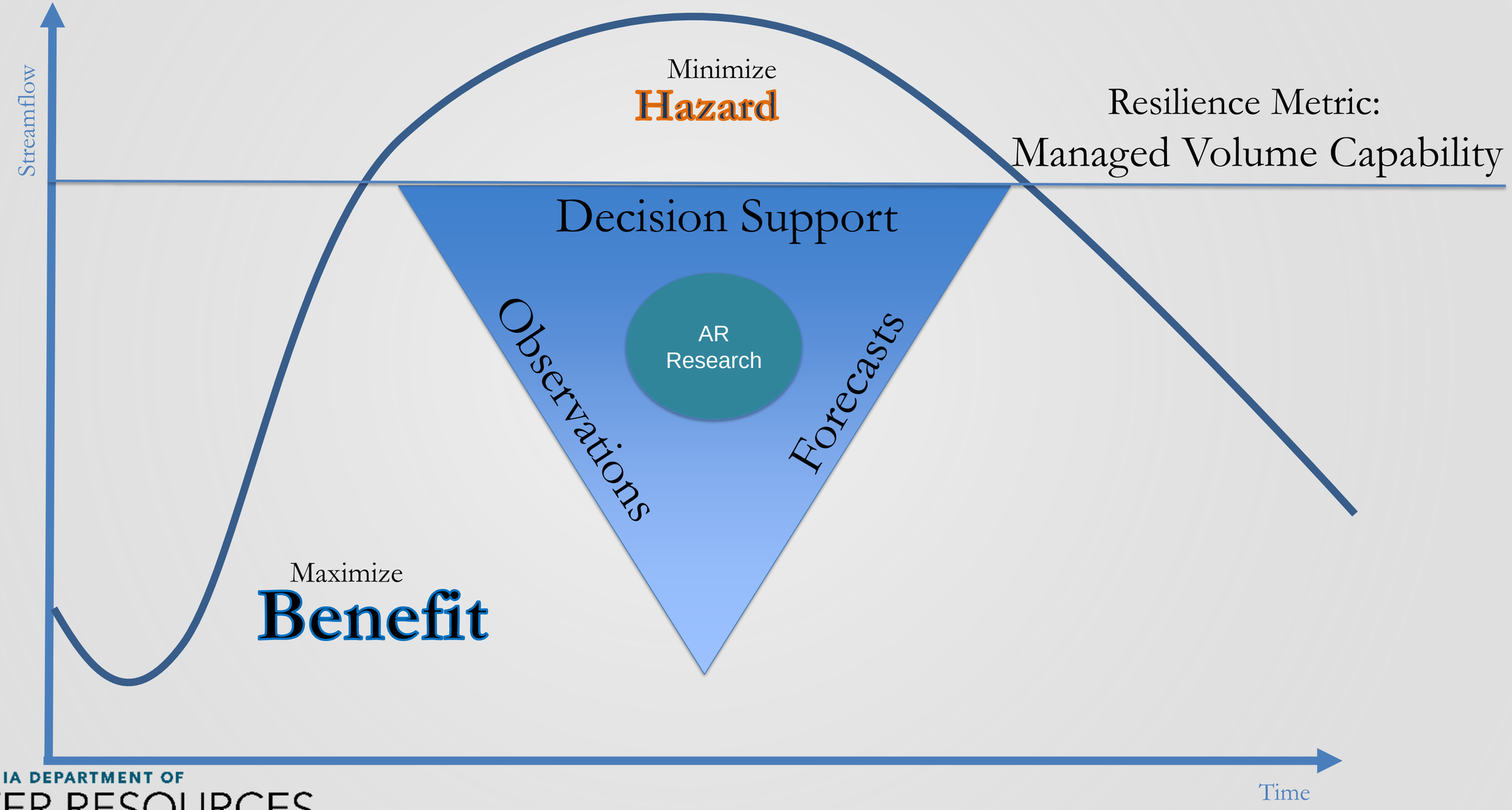
Regions Impacted by Each AR	
State/Region	Times AR Conditions Experienced
Washington	57
Oregon	59
Northern CA	33
Central CA	16
Southern CA	7

62 atmospheric rivers have made landfall over the U.S. West Coast during Water Year 2021



*Arrows are placed on the map where each AR was strongest over the coast

Real-Time Water Management



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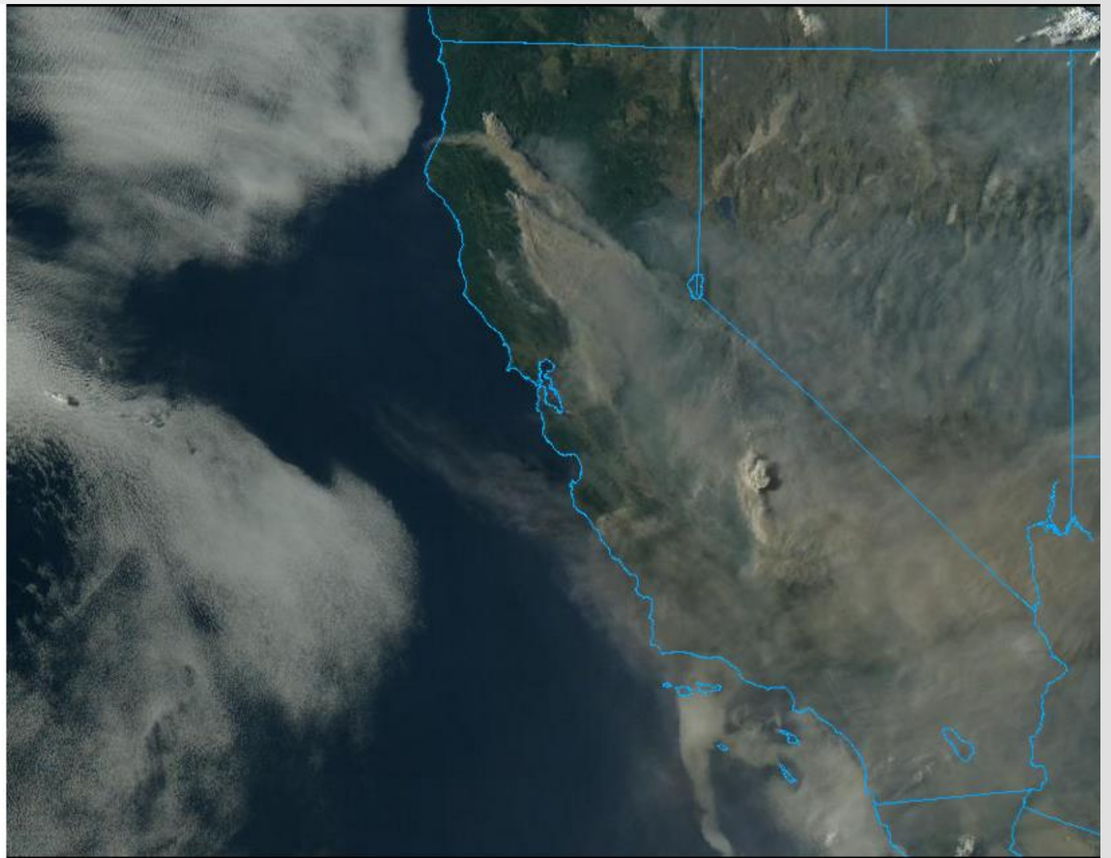
Final Thoughts

- Need to connect climate and weather for effective seasonal to multi-year forecasting
- Need global ocean prediction to improve longer leads in forecasting (heat content important)
- Need sector specific decision support products that may be downstream from NOAA predictions

Questions?

- Email: Michael.L.Anderson@water.ca.gov



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