



Climate Testbed

Second Joint TWDB-UTA-NIDIS Workshop on Texas
Forecast-informed Reservoir
Operation (FIRO)

Matthew Rosencrans

22 Sep 2023



Climate Testbed

MISSION

To accelerate the transition of scientific advances from the climate research community to improved NOAA climate forecast products and services.

VISION

To significantly increase the accuracy, reliability, and scope of NOAA's suite of operational climate forecast products to meet the needs of a diverse user community.

Partnership

WPO funds the projects, CPC and EMC execute the projects



CTB - Who

NCEP

Matthew Rosencrans

CTB Director

David DeWitt

CPC Director

Brian Gross

EMC Director

WPO

Jordan Dale

Testbeds Program Manager

NWS STI

Nicole Kurkowski

<https://www.cpc.ncep.noaa.gov/products/CTB/>



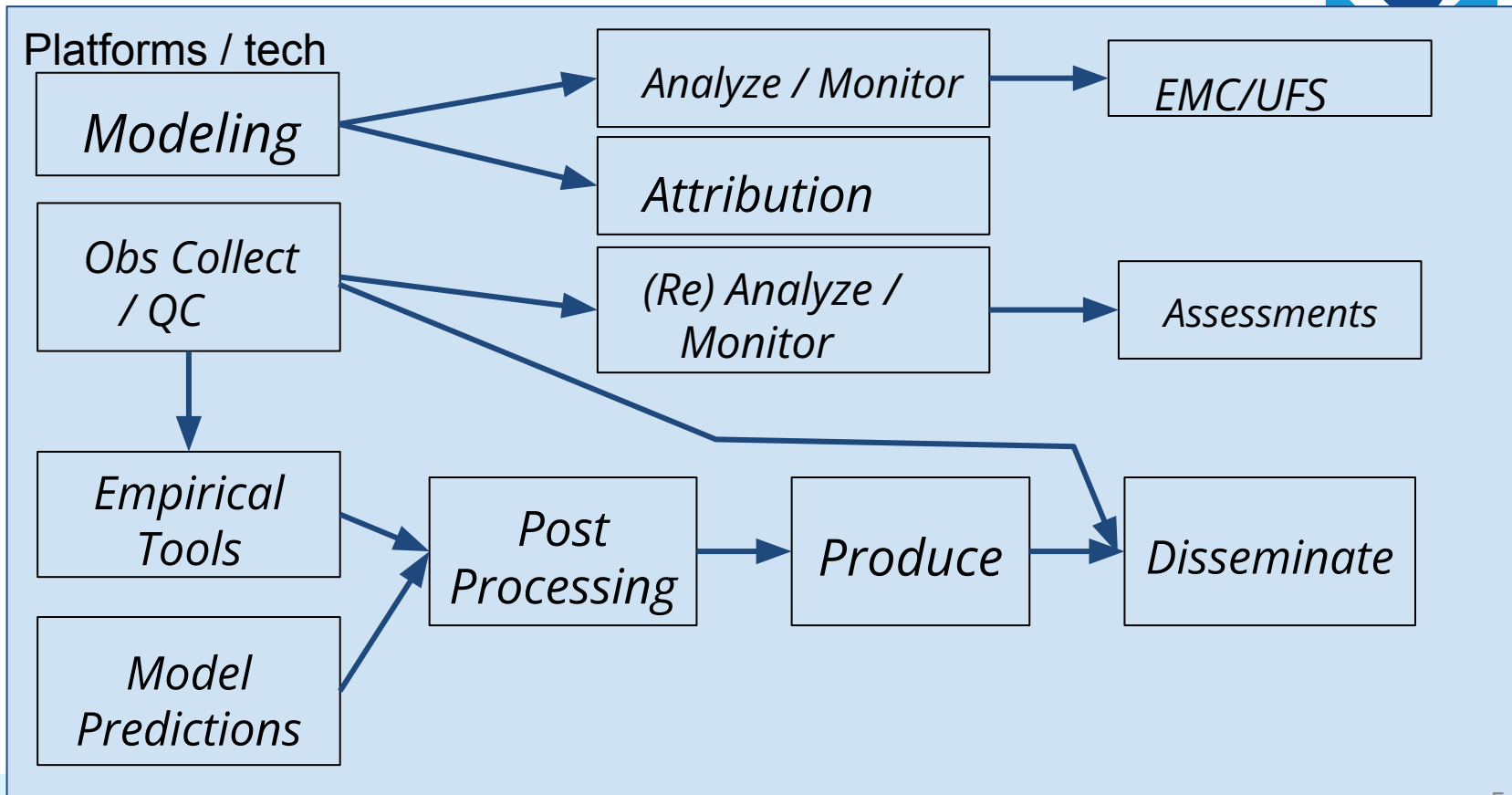
What CTB does



- Contribute to Notices of Funding Opportunity with OAR
 - CTB funding call is out now. <https://wpo.noaa.gov/about-nofo-funding/>
 - Every 2-3 years.
- Funded projects
 - Monitor projects
 - Collab With funding agencies
 - Are you making progress toward your proposal goals? Need to change?
 - How can I help?
- CTB Projects - Evaluation for transition
 - At conclusion of funding period, CTB recommends to CPC management to implement or turn back for more development.



CTB - CPC





Current Cycle Projects

Investigators	Project Title
<i>Funded Projects for FY22 (funding period: Sep 2023 - Aug 2025)</i>	
Paul Roundy and Emerson LaJoie (CPC)	Ensemble Post Processing to Remove Projections onto Temporal Spatial Error Eigenvectors to Optimize Seasonal to Subseasonal Forecasts
Christiana Stan (PI), Avichal Mehra (EMC), F. Martin Ralph, Jiabao Wang, Yutian Wu, Cheng Zheng, Hyemi Kim, Tara Jensen, Andrea Jenney, Daniela Domeisen, Chaim Garfinkel	Diagnostics Package for MJO-Teleconnections
Bo Huang (PI), Mariusz Pagowski, Stephen Penny (EMC), Sergey Frolov, Georg Grell, Jeffery McQueen, Shobha Kondragunta, Jerome Barre	Development of a Global Aerosol Reanalysis at NOAA in Support of Climate Monitoring and Prediction
Baoqiang Xiang, Nathaniel Johnson, Kristen Schepel, Kai-Chih Tseng, Wei Zhang (Co-PI), Daniel Harnos (CPC), Laura Ciaso (CPC)	Transitioning NMME-based seasonal predictions of atmospheric river activity into an operational forecast product

<https://www.cpc.ncep.noaa.gov/products/CTB/projs.htm>



Last Cycle Projects

Investigators	Project Title
<i>Funded Projects for FY20 (funding period: Sep 2020 - Aug 2022)</i>	
Ben Green (GSL) and Vijay Talapragada (EMC)	Accelerating Progress in Subseasonal to Seasonal Prediction Capabilities by Improving Subgrid-Scale Parameterizations in the Unified Forecast System
Xin-Zhong Liang and Yuejian Zhu (EMC)	Improving NCEP GEFS for Subseasonal Forecasts
Christiana Stan, Avichal Mehra (EMC) and Zeng-Zhen Hu (CPC)	ENSO-MJO Diagnostics in an Energetic Framework
Edmund Chang and Wanqiu Wang (CPC)	Developing and Assessing Storminess Indices for Monitoring and Predicting Subseasonal Variations in Storminess near Alaska

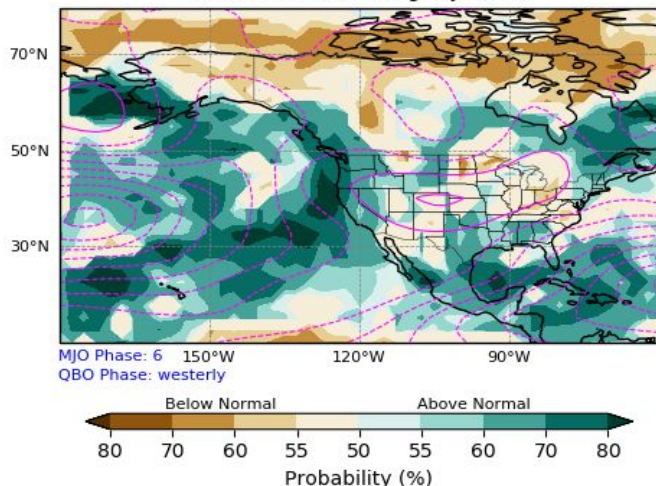
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CTB-FIRO impactful projects

Deliverable from FY18 CTB Project

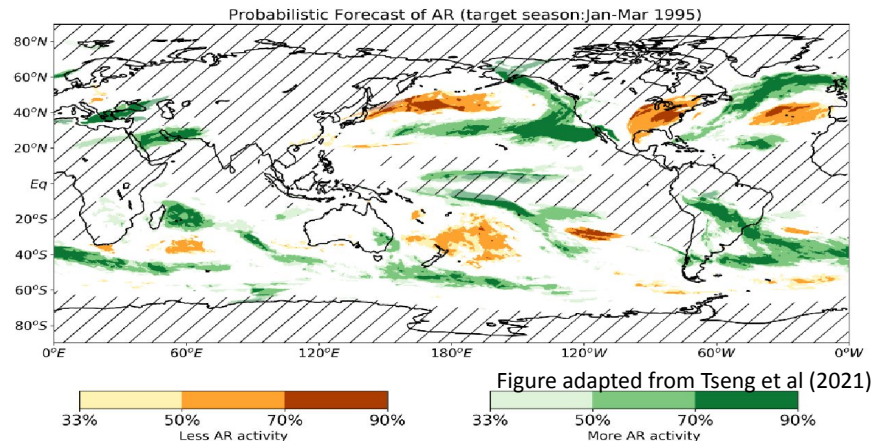
Project delivered an empirical subseasonal Atmospheric Rivers (AR) forecast tool to support WK2 (not shown) and WK34 Outlooks.

WK 3-4 Probabilistic Forecast of Anomalous AR Activity
Issued on 17May2023
Valid for Period Ending 14Jun2023



Proposed Deliverable from FY22 CTB Project

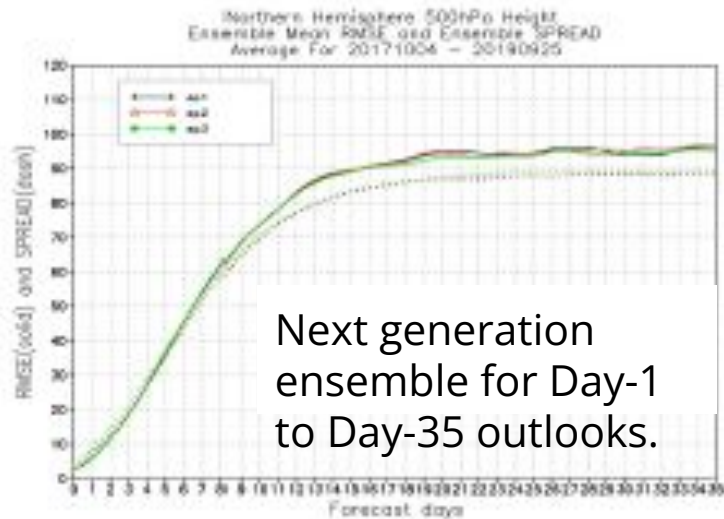
Seasonal atmospheric rivers (AR) forecast tool to support CPC Seasonal Outlooks. The tool will provide probabilistic forecasts of seasonal AR activity over the North America region for individual dynamical models part of the NMME suite.



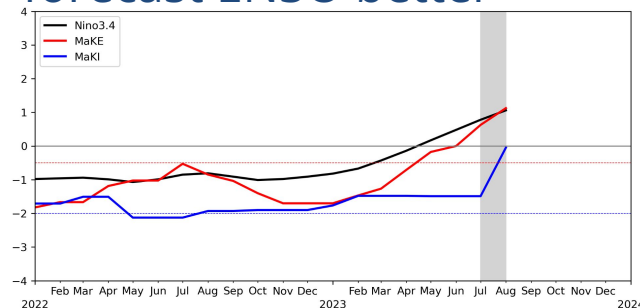
ARs - Helpful to the the West, less helpful downstream. What custom products could be developed for TX?



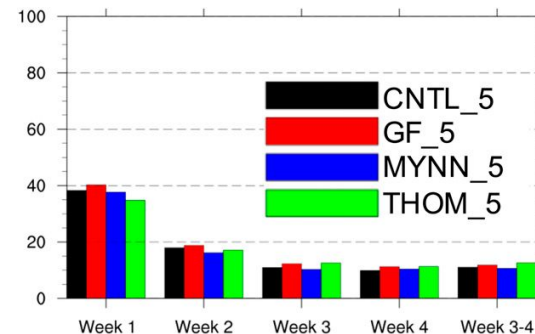
CTB-FIRO impactful projects



Diagnostics that can help us forecast ENSO better



Developing NOAA's flagship subseasonal model





Multi-model Ensembles

CTB also manage(d) the NMME (Subseasonal Experiment)

- [NMME](#)
 - Ongoing since 2011.
 - Contains historical models runs back to 1991 (subset go back to 1982)
 - Currently in the middle of rewrite of protocols.
 - NMME user's workshop (some crossover attendees/presenters here)
 - What are the most important gaps that NMME could fill?
- Subseasonal Experiment
 - 2015-2023 - Experiment is now over (from NOAA perspective)
 - Operational models largely taking over realtime component.



Related CPC Development

- Water Resources (in collab with RFCs)
 - Water year outlooks - models and stats
 - ESF - Trace weighting enhancements
 - Post-processing data for RFCs
 - Sending data streams to OHRFC and CNRFC as inputs to HEFS
- Downscaling
 - Outlooks that fit needs for resolution in time and space — Balanced with analysis and compute resources.
 - Need to explore extremes in this context.
- Machine learning
 - Using AWS Cloud and AI models to make better Week-2, Week3/4 outlooks.
 - Also potentially provides the data to RFCs immediately.



Related CPC Development

- QPF is the tall pole
 - UFS development
 - Reforecasts - best/latest tech applied to historical events.
 - UFS post-processing
- Regimes/Diagnostics
 - Reanalysis - Conditions for 1950-Present
- Week-2
 - Flash Drought, Snow-water equivalent (experimental)
- Week 2-3 Tropical Cyclone outlooks
- Transitioning EDDI to CPC
 - Adding some attribution aspects