The Challenges of Seasonal Forecasting

• “Weather people cannot even get tomorrow’s forecast right. How can they get it right 3 to 6 months from now”?

• Another issue is public understanding of probabilistic forecasts vs. deterministic forecasts.

• However, atmospheric and coupled forecast system models continue to evolve.
How do you Solve this Problem?
There are tools that are available.

- Trends and Statistical Models.
- Soil moisture data.
- Composites from previous analog years.
- Atmospheric models and new coupled models which factor in both atmospheric and oceanic predictors.
- Ensemble Forecasts.
- Seasonal to semi-annual to yearly signals.
- Decadal signals.
Statistical Tools.
Optical Climate Normals (OCN)

Compares the most recent 15 year trend to the 1981-2010 30 year normal.
Soil Moisture Anomalies and Percentiles

Can help one make weekly to seasonal temperature or precip forecasts based on ensuing atmospheric impacts
Composite Forecasts from Prior Analog Years

NOAA/NCDC Climate Division Precipitation Anomalies (in)
Nov to Apr 1997–98
Versus 1981–2010 Longterm Average

NOAA/NCDC Climate Division Precipitation Anomalies (in)
Nov to Apr 1982–83
Versus 1981–2010 Longterm Average

1997-1998

1982-1983
Coupled Forecast Models which Account for both Sea Surface and Atmospheric Conditions.

Dec/Jan/Feb 2015/16 precipitation (left) and Temperature anomalies from the NOAA Coupled Forecast System Version 2 (CFSv2).
National Multi-Model Ensemble (NMME).

Dec/Jan/Feb 2015/2016 precipitation (left) and temperature forecast from the NOAA NMME.
NMME is a compilation of various climate scale models from Canada and the USA.
Seasonal Signals like El Nino and La Nina also provide clues
One of the Three Strongest El Niño Events on Record Underway.

Niño 3.4 SSTs exceeding +0.5°C for at least five 3-month periods denotes an El Niño
La Nina of 2010-2012 and Drought Replaced by El Nino.

Typically last at least 6 months to as long as 2 years.
....and leads to this...

BRING IT ON, EL NIÑO
Decadal Oscillations

warm phase

cool phase

monthly values for the PDO index: 1900-2013

Pacific Decadal Oscillation
Interaction of Pacific Decadal Oscillation and the Atlantic Multidecadal Oscillation

When the PDO is – and the AMO is +, drought conditions are favorable for the US.
Relationship between Decadal Oscillations and US Precipitation.
Putting it All Together

Dec/Jan/Feb Composite of 6 previous strong El Nino events since 1950.
Latest NWS Climate Prediction Center Forecast for Winter 15/16.

All indications show an increased chance for cooler than normal temps across TX and most of OK and increased chances for above normal precipitation.
Summary

- Short term “flash drought” currently impacting much of TX and OK.
- Seasonal signals (El Nino) and composites plus coupled model forecasts show this should break by November (perhaps next week?).
- Longer term decadal trends show signals for reduced chances for drought going forward (PDO+/AMO-).
Questions??

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