NCEI, CPC, & IRI Drought Recovery Tools

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Exploring Drought Recovery Climate Tools in the Western U.S. Workshop

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Overview

- NOAA National Centers for Environmental Information (NCEI) Palmer Drought Termination & Amelioration
- NOAA National Weather Service Climate Prediction Center (CPC) Palmer Precipitation Needed to End Drought
- Columbia University's International Research Institute for Climate and Society (IRI) SPI-based Drought Prediction



NCEI Palmer Drought Termination & Amelioration

Current Drought Reduction

Probability of Precipitation Required to Ameliorate Current Drought Conditions in Two Months August 2015



Data File: Precip to End Current Drought 🕮

The end of a drought is defined by a PHDI value of -0.5. Drought amelioration is achieved when a PHDI value of -2.0 is reached.



http://www.ncdc.noaa.gov/temp-and-precip/drought/recovery/



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NCEI Palmer Drought Termination & Amelioration

- Based on the Palmer model (PHDI Palmer Hydrological Drought Index)
 - Primitive soil moisture component
- Reverses equations to get precipitation
- Tells you only precip amount needed to change the PHDI value to -2.0 or -0.5
 - Says nothing about impacts or groundwater recovery or reservoir recovery or snowpack
- Monthly time scale, updated once a month
- NCEI nClimDiv data set, 1895-present





CPC Palmer Precipitation Needed to End Drought



http://www.cpc.ncep.noaa.gov/products/ analysis_monitoring/regional_monitoring/addpcp.gif



CPC Palmer Precipitation Needed to End Drought

- Based on the Palmer model (PDI Palmer Drought Severity Index)
- Precip needed over the next 4 weeks (quasi-monthly)
- Tells you only precip amount needed to change the PDI value to -0.5
 - Says nothing about impacts or groundwater recovery or reservoir recovery or snowpack
- Quasi-monthly time scale (28 days), but sliding 28day periods are updated weekly (thru Saturday)
- CPC preliminary daily data set, 1931-present

http://www.cpc.ncep.noaa.gov/products/ analysis_monitoring/regional_monitoring/addpcp.gif



Both the NCEI & CPC Palmer Drought Recovery Tools Use Climate Division Data





IRI SPI-based Drought Prediction

	ediction Tool: SPI Multi-Model Ensemble Forecast	
De Lead Time SPI Threshold 1.0 ▼ Month 0.0 ▼ 1.0 2.5 2.0 3.0 ataset [1.5	rought Prediction Tool: SPI Persistence F Map Type SPI Period Probability of Non-Exceedance Probability 3-Month SPI 0.9 Image: SPI Value SPI Value 0.9 Probability Probability 0.9 Probability Probability 0.9 Probability Probability 0.9 Probability Probability 12-Month SPI Probability Probability 12-Month SPI Probability Probability 12-Month SPI Probability Probability	
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Here, forecasts of SPI are Multi-Model Ensemble who correlation skill of the SPI leads, and locations where the correlation skill of for Ensemble is lower than that of the SPI Persistenc Persistence forecast is used. The forecast start till end of the last available month of observations (en essentially, 00Z on the first day of the following m	0.35 0.3 lation periods) in fu •3 •4 • • • • • • • • • • • • • • • • •	
which is the issue time of the IRI Multi-Model Ens'- Use the "Map Type" menu to choose a map of for between 0 and 1) that SPI in a future month will h menu. Alternatively, the "SPI Value" map shows th probability chosen from the "Probability of Non-Fxc	0.15 0.1 0.05 eedance" drop-down menu. The color shown in the "SPI Threshold" or "Probability of	

probability chosen from the "Probability of Non-Exceedance" drop-down menu. The color shown in the "SPI Threshold" or "Probability of Non-Exceedance" drop-down menu is that associated with the chosen value in the probability or SPI color scale. Other menus select the SPI accumulation period (3, 6, 9, or 12-month SPI) and forecast <u>lead time</u> (in months) of interest. Click and drag on the map to zoom in. To select which administrative boundaries to display on the map (including U.S. counties), mouse over the map and select the "Layers" icon. Then use the check boxes that appear above the map to select the corresponding administrative boundaries.

The SPI maps provide an indication of short-term to longer-term wet (green, positive SPI) or dry (yellow to red, negative SPI) conditions based upon precipitation alone. The negative half of the color scale uses the same colors and thresholds of SPI corresponding to the percentiles associated with the D0 (30%tile) to D4 (2%tile) drought intensity categories used in the U. S. Drought Monitor.

http://iridl.ldeo.columbia.edu/maproom/Global/Drought/N_America/



IRI SPI-based Drought Prediction Multi-Model Ensemble Forecast

- Based on the SPI Standardized Precipitation Index
- Monthly precipitation totals from the CPC Global Unified gridded precipitation dataset fed into Multi-Model Ensemble Forecast
- Predicts 3-month to 12-month SPI one or several months in the future, based on predicted precipitation
- Monthly time scale, updated once a month
- Source data 1979-present
- Gridded (contoured) or climate division formats

http://iridl.ldeo.columbia.edu/maproom/Global/Drought/N_America/



IRI SPI-based Drought Prediction Multi-Model Ensemble Forecast

Tells you only information about the predicted SPI

- Predicted 3-, 6-, 9-, or 12-month SPI for a selected nonexceedance (probability) level, or
- Forecasted probability of 3-, 6-, 9-, or 12-month SPI being below a selected SPI threshold



IRI SPI-based Drought Prediction Multi-Model Ensemble Forecast

- Tells you only information about the predicted SPI
 - Predicted 3-, 6-, 9-, or 12-month SPI for a selected nonexceedance (probability) level, or
 - Forecasted probability of 3-, 6-, 9-, or 12-month SPI being below a selected SPI threshold
 - Says nothing about impacts or groundwater recovery or reservoir recovery or snowpack





Summary

- These tools give information about drought indices, precipitation, and probabilities.
- But they need to be used in conjunction with other tools to get a more comprehensive picture of what is needed to end a drought or recover from a drought.





