

J2.6 A SUITE OF WEB PAGES FOR ANALYZING CLIMATE SIGNALS IN LARGE DATASETS

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1. Introduction

The ability to readily search for and quantify climate signals is of great importance in climate research. In practice, it can take a long time to perform such analyses as various datasets must be downloaded and read, code must be written to perform the analysis and the results must be plotted. Time and sufficient computer resources must be available and data will need to be updated and any new datasets must be downloaded. At CDC, we have greatly reduced the amount of effort required of exploratory researchers by providing a set of web pages that allow users to analyze many of our large datasets including model analyses and climate model output. Specifically, the user can interactively examine the relationship between a monthly (or seasonal) time series and the variables in various gridded (and one non-gridded) global datasets. The users can seek linear relationships by examining correlations between an index time series and different variables or they can examine possible nonlinear relationships by compositing variables according to specified criteria. The time series for these composites or correlations can be user supplied, CDC supplied or generated via our web pages. The pages can be found at:

http://www.cdc.noaa.gov/PublicData/web_to_ols.html

and consist specifically of the pages:

<http://www.cdc.noaa.gov/Timeseries/>
<http://www.cdc.noaa.gov/Composites/>
<http://www.cdc.noaa.gov/Correlation/>

2. Programming Details

Each of the three web pages is an HTML form, which is processed using a Perl script. Most of the analysis is performed using FORTRAN programs, which are run by the Perl scripts. Plots are created using GrADS batch scripts and off the option of GIF or PNG and postscript output. Some plots are created using FORTRAN NCAR graphics code.

User supplied time series are currently FTP'd to a CDC public directory using anonymous FTP and they are read by a Perl script.

3. Dataset Details

The NCEP/NCAR Reanalysis is the primary dataset read by these web tools. CDC has calculated monthly means of many variables. We provide access to a subset of the most desired variables. Other datasets available include the US climate division data (temperature, precipitation and PDSI) and some other gridded fields such as Reynolds SST. We plan to add more over time.

CDC supplied index time series are obtained from many sources, which are documented on the web site along with appropriate citation references.



Figure 1

4. Time Series Creation Web Page

The page <http://www.cdc.noaa.gov/Timeseries/> allows users to create a monthly mean or seasonal time series. The user first selects a dataset and then a variable. Years and optional seasonal averages for the time series can be input as well as the latitude/longitude extent of a gridded area to be averaged. The output format which can be used by the Correlation or Composite page lists 12 monthly values for all the years selected plus some information about the time series. For the

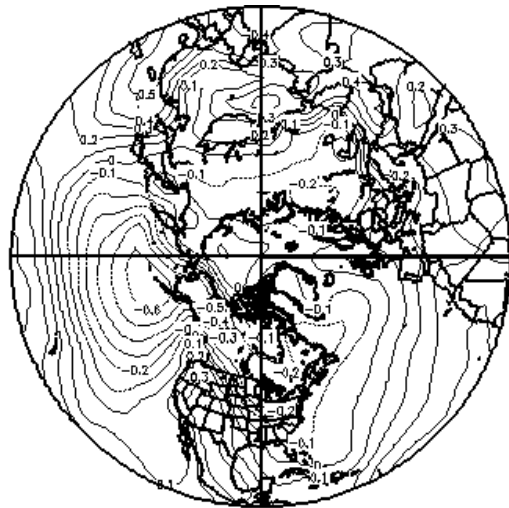
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Climate Divisions data, anomalies and ranks are also available. An example of the time-series creation form is shown in Figure 1.

5. Correlation Web Page

The web page <http://www.cdc.noaa.gov/Correlation/> allows users to correlate a time series. The time series may be generated via the Time Series page described in section 4, supplied by the user or obtained at CDC (e.g. the PNA or Nina 3.4). User supplied time series are FTP'd to a specified directory where they can be used for correlations. The time series is correlated in time with variables from the Reanalysis. The time-series can be lead/lagged by up to 12 months. Lat/Lon maps are the typical output but for some variables, vertical cross-sections (latitude by height) are also available. A sample output plot which shows the correlation of the PNA leading geopotential height is available in Figure 2.

Obtaining the time-series via a web page is our eventual goal.



Jan to Feb: 1950 to 2000: 1000mb Geopotential Height Seasonal Correlation w/ Dec to Jan PNA (index leads by 1 month)
NCEP/NCAR Reanalysis

Figure 2

6. Composite Web Page

The web page <http://www.cdc.noaa.gov/Composites/> will composite (average) variables based on specified criteria. These criteria include years, which can be input singly, as a range or as an input time-series. The variables can also be composited based on values in a specified time-series. For example, a person could select the SOI index and composite on values greater than 2.0 or a time-series of precipitation in one of the

Colorado climate divisions and composite on all May zonal winds that had greater than 10 inches of rain. In addition, compositing can be done by subtracting one set of years from another. Again, users can enter the name of the time series they wish to use or they can use a CDC supplied time series.

Figure 3 shows a selection of the input options where a user specifies that summertime surface winds be composited for years where the (supplied) surface temperature time series has an anomaly that exceeds 5°C.

7. Future Directions:

In addition to adding new datasets and index time-series, we plan to link together the pages more transparently. This may include using Java-beans or similar technology to save sessions so that users can go from one page to another without reentering time-series names.

Which variable? Analysis level?

Beginning month of season Ending month

Enter Years for composites (from 1 to 16) e.g. 1972. For seasons that span a year (e.g. DJF), please enter year of the LAST month.

To subtract one set of years from another, use a minus sign (-) before the years that are to be subtracted.

OR Enter range of years

to (optional minus to)

OR Timeseries for composite

Time Series? If custom:

Value to composite on Type of comparison:

Figure 3