

Brian Brettschneider's NCEP/NCAR Rankings and Time Series Page (June 2023)

This is a brief write-up on my NCEP/NCAR (R1) Reanalysis rankings webpage. URL is:

<http://data.61n150w.com/rankings.php>

A few quick items:

1. It's a public webpage, but please keep the distribution limited.
2. Only use layers 1, 2, 3, 6, 10-18, 19, 22, 23, 24, 25, 27, and 28 on the screen capture below. Other options are either very slow or not up-to-date.
3. It's slow. When you run it, it takes 1.5 to 3.5 minutes to run. DO NOT do a page refresh. The map will appear when the process finishes. If you refresh, no map.
4. It only runs one process at a time.
5. A process cannot be stopped once it starts.
6. There is VERY limited error trapping. It is easy to generate an error. E-mail me if you get an error and I can usually figure it out.
7. The first year of the data sets is mostly not used. Sorry.
8. Archive of maps: <http://data.61n150w.com/images/?C=M;O=D>
9. Archive of csv time series: <http://data.61n150w.com/images/queries/?C=M;O=D>

Use the forms below to enter parameters for the ranking program

Layer to map: 1 = Air Temp, 2 = 2-meter Temp, 3 = Skin Temp, 4 = NASA GISS (late/slow), 5 = Berkeley Earth (late/very slow), 6 = ERSST v.5 SSTs, 7 = OISST v.2 SSTs (late/slow), 8 = Oceanic Heat Content 105m (late/very slow), 9 = Oceanic Heat Content 303m (late/very slow), 10 = SLP, 11 = Height at pressure level (select level), 12 = Temp at pressure level (select level), 13 = Height Thickness (select levels), 14 = Temperature Between Pressure Levels, 15 = Wind Speed (select level), 16 = U-wind component (select level), 17 = V-wind component (select level), 18 = U-wind Shear (select levels), 19 = Precipitable Water, 20 = Precip Anomaly (late), 21 = Precip mm/Day, 22 = Relative Humidity (select level up to 300 mb), 23 = Specific Humidity (select level up to 300 mb), 24 = Total Cloud Cover, 25 = Tropopause Height (gpm), 26 = Moist Enthalpy (alt Heat Index), 27 = Potential Velocity (0.2101 sigma), 28 = Upward Longwave Flux, 29 = 20th Century Reanalysis temps (1937-2015/SLOW!!!), 30 = HadCRUT5 (Since 1851), 31 = CRUTMP5 (Since 1851), 32 = NASA GISS Land			
Choose Theme (1-32): <input type="text" value="0"/> Description	Detrend Data (0 = No, 1 = Yes): <input type="text" value="0"/>	Data Values Only (0 = No, 1 = Yes): <input type="text" value="0"/>	Save NetCDF (0 = No, 1 = Yes): <input type="text" value="0"/>
Pressure Level: 0 = 1000mb, 1 = 925mb, 2 = 850mb, 3 = 700mb, 4 = 600mb, 5 = 500mb, 6 = 400mb, 7 = 300mb, 8 = 250mb, 9 = 200mb, 10 = 150mb, 11 = 100mb, 12 = 70mb, 13 = 50mb, 14 = 30mb, 15 = 20mb, 16 = 10mb Note 1: use lower pressure level 0 for surface themes - layers 1, 3, 7, 8, and 10. Note 2: use only lower pressure level for themes 2, 4, 5, 6, 9, and 11. Note 3: use lower and upper pressure levels for themes 12, 13, and 14. Lower pressure level: <input type="text" value="0"/> Upper pressure level: <input type="text" value="0"/>		Bounding Coords for Rank Computation North Lat <input type="text" value="90"/> Left Lon <input type="text" value="0"/> South Lat <input type="text" value="-90"/> Right Lon <input type="text" value="360"/> This computes a single, rank value for the selected time period. Click HERE for a blank map with labelled grid lines. Use Pre-Loaded Shapefile: (0=No, 1=Alaska, 2=Lower 48, 3=U.S./Canada, 4=Arctic Basin, 5=Alaska/NW Canada, 6=Bering Sea, 7=Gulf of AK, 8=Bering+Gulf of AK, 9=Entire U.S.A., 10=Europe, 11=Australia, 12=Alaska 200 Miles, 13=Alaska 60N, 14=Global Land, 15=Land 60N, 16=Cen Aleutians, 17=W. Aleutians, 18=E. Aleutians, 19=E. Gulf AK, 20=W. Gulf AK, 21=SE Bering, 22=N. Bering, 23=GOA 2, 24=Bering 2, 25 = Bristol Bay 2) <input type="text" value="0"/>	
Last month to start evaluation (e.g., 2 for Feb): <input type="text" value="1"/> Number of months (up to 12) to evaluate (e.g., 3 for Dec-Feb): <input type="text" value="1"/>	Begin Climo <input type="text" value="1991"/> End Climo <input type="text" value="2020"/>	Year of last month for assessment: <input type="text" value="2023"/>	Map Type: 1=Cylindrical, 2=North Pole (NH Only), 3=Lambert Equal Area (Best for High Lats): <input type="text" value="1"/>
Manually Enter Map Bounds: 0=No, 1=Yes <input type="text" value="0"/> North Lat <input type="text" value="80"/> South Lat <input type="text" value="45"/> Left Lon <input type="text" value="180"/> Right Lon <input type="text" value="240"/> Note 1: Coords only used if map type is Cylindrical (1) or Lambert Equal Area (3). Note 2: If Using Lambert Equal Area, make sure longitude spread is <= 50° in mid-latitudes.		Year range for trend analysis: Start <input type="text" value="999"/> (999 is var default) End <input type="text" value="2023"/> If you change the start date, it changes the start date for ranking maps too. End date change does not affect end date for rankings. Analysis Type: 1 = Ranks, 2 = Max Year, 3 = Min Year, 4 = Trend, 5 = std. dev. <input type="text" value="1"/> Min/Max % >= <input type="text" value="2023"/>	
Central Longitude for N. Pole maps (0 to 360): <input type="text" value="210"/> Low Latitude for N. Pole maps (-20 to 70): <input type="text" value="20"/>			

Raw data obtained from [ESRI](#). Analysis may not be accurate. Use at your own risk!

(to reset form, select theme 0 and press button)

Options (see screen capture on prior page):

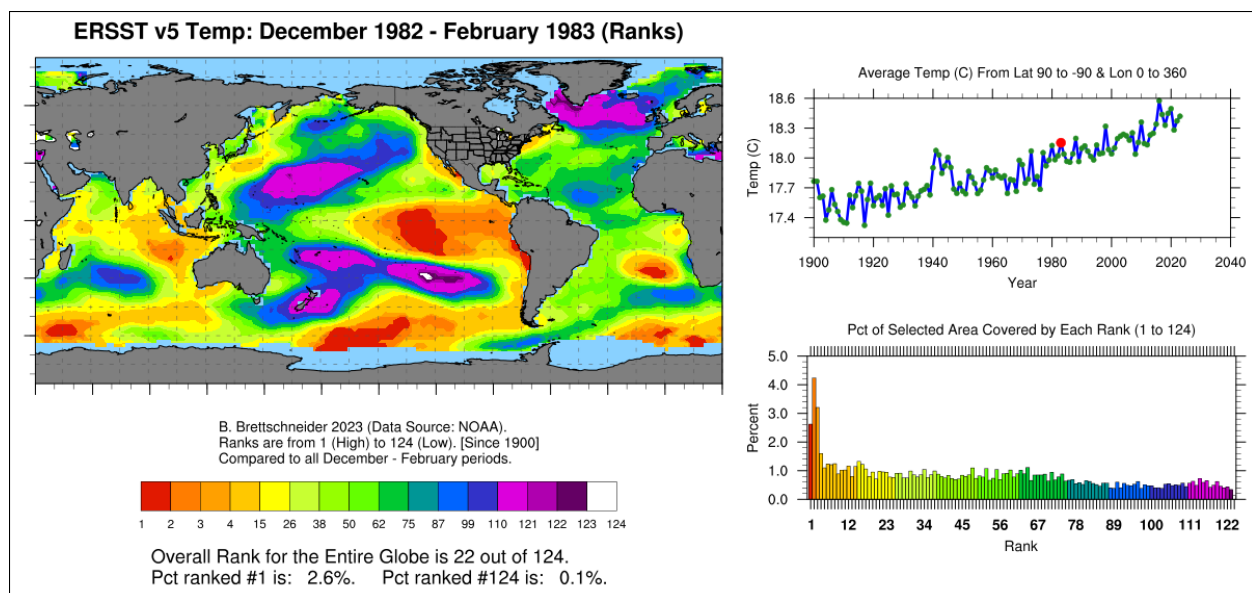
- **“Layer to map”** – These are the R1 (and some other) variables. Items 11-18 require a vertical selection (see “Pressure Level” section). Use the “Choose Theme” drop down to select the theme. You can also do a linear detrend in this section too. **If you choose Yes for “Data Values Only”, it runs much faster and prints to the screen average values for each year (weighted by latitude).**
- **“Pressure Level”** – For themes 11-18, you need to select 1 or more pressure levels. Some items, like item 14 (Temperature Between Pressure Levels) will require two pressure levels. If you only need one pressure level (e.g., 500 mb height), you only need to select a Lower Pressure Level.
- **“Bounding Coordinates for Rank Computation”** – When computing a time series, the default extent is the entire globe. You can select rectangular bounding coordinates in this section. Latitude runs from 90 to -90. Longitude runs from 0 to 360, where 0 is the Prime Meridian and longitude increases as you move eastward. There are also pre-loaded shapefiles that can be selected here. These use the actual shape and not a rectangular version of the shapes.
- **“Last Month”** – This is the ending calendar month (1 to 12) of the analysis. For example, 6 is June, 3 is March, and 12 is December.
- **“Number of Months”** – You can do an analysis of up to 12 months. If you want to do a Dec-Feb analysis, the Last Month is 2 (for February) and the Number of Months is 3, because it is a 3-month period.
- **“Begin Climo”** and **“End Climo”** – This is user-defined climate normal period. It is only used when the Map Type is “std dev”.
- **“Year of last month for assessment”** – This is the year that you are assessing for a rank. It is associated with the Last Month chosen above. For example, if you want to know where Nov 1974 - Mar 1975 ranked, the Last Month is 3 (for March), the Number of Months is 5, and the year is 1975. Make sure that you don’t choose a year in the future.
- **“Map Type”** – Map Type 1 is a global rectangular map. Map Type 2 is a north polar map. Map Type 3 is a subset of the rectangular map.
- **“Manually Enter Map Bounds”** – If you use Map Type 3 above, you MUST select “Yes” for manually entering the map bounds. Then enter bounding lat/lon coordinates.
- **“Year Range for Trend Analysis”** – 999 is the default value. You can subset the years a little bit here. The main use it to choose an earlier start year. For example, ERSST starts in 1855, but if you want to start the rankings/time series in 1900, enter 1900 in the Start box. Make sure that this is not after your climo period entered above – otherwise you will get an error. I never change the End year box.
- **“Analysis Type”** – Option 1 is for Ranks. Option 2 is for the year with the highest value. Option 3 is for the year with the lowest value. Option 4 is for a regression trend (Note: It only shows statistical significance – not trend values). Option 5 is for the standard deviations from the climate normal period. No matter the Analysis Type, if you choose “Data Values Only” in the first section, it will just print the average values of the theme for each year to the screen.
- **“Central Longitude”** and **“Low Latitude”** – These are for when Map Type is set to Option 2 (North Polar). It sets the longitude where the map will be centered and it sets how far south the latitude will be mapped. The default is longitude 210E (150W) and to show all areas north of 20N.

Example 1: Global Dec-Feb 1982-83 ERSST Ranks since 1900. Time Series is Global.

Use default values, except

- Layer to map (Choose Theme) is 6 (ERSSTv5).
- Bounding Coordinates for Rank Computation (mostly for time series) is 90 to -90 and 0 to 360.
- Last Month is 2 for February and Number of Months is 3 for three months (Dec, Jan, Feb).
- Year of last month of assessment is 1983.
- Map Type is 1 (Cylindrical).
- Year range for analysis Start year is 1900.

Run time: 3:05



Link to image: http://data.61n150w.com/images/1983_6_2_3_0_0_1_90_-90_0_360_1_0_panel.png

Link to image (without time series): http://data.61n150w.com/images/1983_6_2_3_0_0_1_90_-90_0_360_1_0.png

Link to higher resolution image: http://data.61n150w.com/images/1983_6_2_3_0_0_1_90_-90_0_360_1_0_big.png

Link to csv time series: http://data.61n150w.com/images/1983_6_2_3_0_0_1_90_-90_0_360_1_0_values.txt

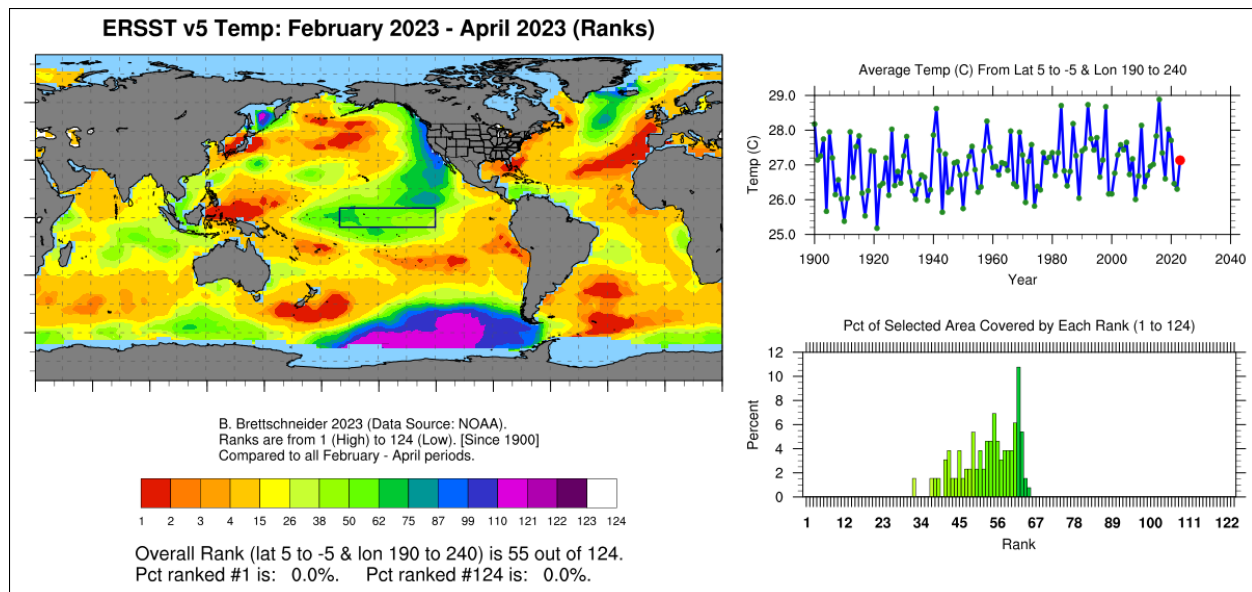
Description: This is a global ocean ranking from 1 to 124 of the Dec-Feb 1982-83 period. Red areas show where it has the highest Dec-Feb average value (warmest) since 1899-1900. White areas are the 124th ranked (coolest). In the time series, there is a red dot for Dec-Feb 1982-83. The area of interest is the entire global ocean (where there is data). The bar graph in the lower right shows a frequency distribution of the ranks from 1 to 124 for Dec-Feb 1982-83.

Example 2: Global Feb-Apr 2023 ERSST Ranks since 1900. Time Series is ENSO 3.4 Region.

Use default values, except

- Layer to map (Choose Theme) is 6 (ERSSTv5).
- Bounding Coordinates for Rank Computation (mostly for time series) is 5 to -5 and 190 to 240.
- Last Month is 4 for April and Number of Months is 3 for three months (Feb, Mar, Apr).
- Year of last month of assessment is 2023.
- Map Type is 1 (Cylindrical).
- Year range for trend analysis Start year is 1900.

Run time: 2:05



Link to image: http://data.61n150w.com/images/2023_6_4_3_0_0_1_5_-5_190_240_1_0_panel.png

Link to image (without time series): http://data.61n150w.com/images/2023_6_4_3_0_0_1_5_-5_190_240_1_0.png

Link to higher resolution image: http://data.61n150w.com/images/2023_6_4_3_0_0_1_5_-5_190_240_1_0_big.png

Link to csv time series: http://data.61n150w.com/images/2023_6_4_3_0_0_1_5_-5_190_240_1_0_values.txt

Description: This is a global ocean ranking from 1 to 124 of the Feb-Apr 2023 period. Red areas show where it has the highest Feb-Apr average value (warmest) since 1900. White areas are the 124th ranked (coolest). The area of interest is the Niño 3.4 region (5°N to 5°S and 190°E to 240°E). A box is drawn around this region on the map. In the time series, there is a red dot for Feb-Apr 2023. The bar graph in the lower right shows a frequency distribution of the ranks from 1 to 124 for Feb-Apr 2023.

Example 3: Time Series (CSV) Since 1900 for April ENSO 3.4 Region (no map).

Use default values, except

- Layer to map (Choose Theme) is 6 (ERSSTv5).
- Data Values Only is 1 for Yes.
- Bounding Coordinates for Rank Computation (mostly for time series) is 5 to -5 and 190 to 240.
- Last Month is 4 for April and Number of Months is 1 for just that month (Apr only).
- Year range for trend analysis Start year is 1900.

Run time: 0:06

This is a quick and dirty list of average value for the selection area.
Temp (C) : ERSST v5 Temp:
Selected area is lat 5 to -5 & lon 190 to 240.

Year	Value	NumPoints
1900	28.4577	130
1901	27.5097	130
1902	28.2147	130
1903	27.6463	130
1904	26.7403	130
1905	28.5102	130
1906	27.3952	130
1907	26.8448	130
1908	26.5913	130
1909	26.6554	130
1910	26.3039	130
1911	26.7232	130

2013	27.5779	130
2014	27.9038	130
2015	28.5238	130
2016	28.7333	130
2017	28.0324	130
2018	27.3221	130
2019	28.4693	130
2020	28.1982	130
2021	27.1152	130
2022	26.7158	130
2023	27.9151	130

http://data.61n150w.com/images/queries/ersst_Apr_5_-5_190_240.txt

Link to csv time series: http://data.61n150w.com/images/queries/ersst_Apr_5_-5_190_240.txt

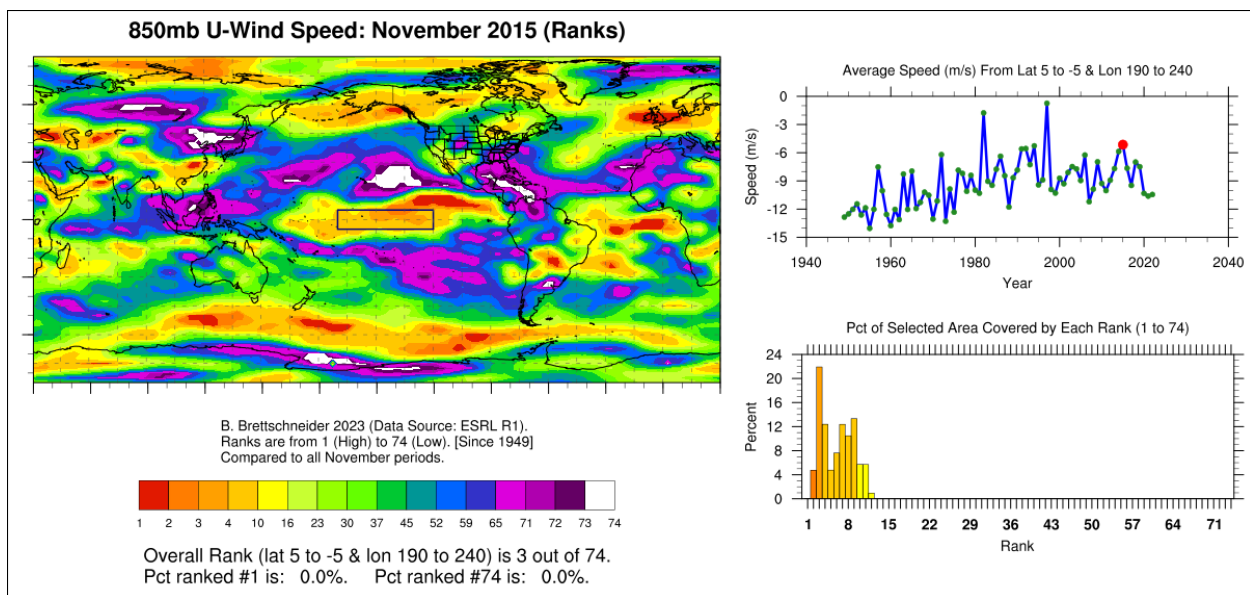
Description: This is just the time series for ERSST for the April time period. It prints to the screen the year, average value, and the number of grid cells (points). It runs in just a few seconds. These can be copied and pasted into a spreadsheet.

Example 4: Global Nov 2015 850 mb U-Wind Ranks Since 1949. Time Series is ENSO 3.4 Region.

Use default values, except

- Layer to map (Choose Theme) is 16 (U-Wind).
- Lower Pressure Level is 2 for 850 mb.
- Bounding Coordinates for Rank Computation (mostly for time series) is 5 to -5 and 190 to 240.
- Last Month is 11 for November and Number of Months is 1 for just November.
- Year of last month of assessment is 2015.
- Map Type is 1 (Cylindrical).
- Year range for trend analysis Start year is 999. (This is a default value for all themes.)

Run time: 1:20



Link to image: http://data.61n150w.com/images/2015_16_11_1_2_0_1_5_-5_190_240_1_0_panel.png

Link to image (without time series): http://data.61n150w.com/images/2015_16_11_1_2_0_1_5_-5_190_240_1_0.png

Link to higher resolution image: http://data.61n150w.com/images/2015_16_11_1_2_0_1_5_-5_190_240_1_0_big.png

Link to csv time series: http://data.61n150w.com/images/2015_16_11_1_2_0_1_5_-5_190_240_1_0_values.txt

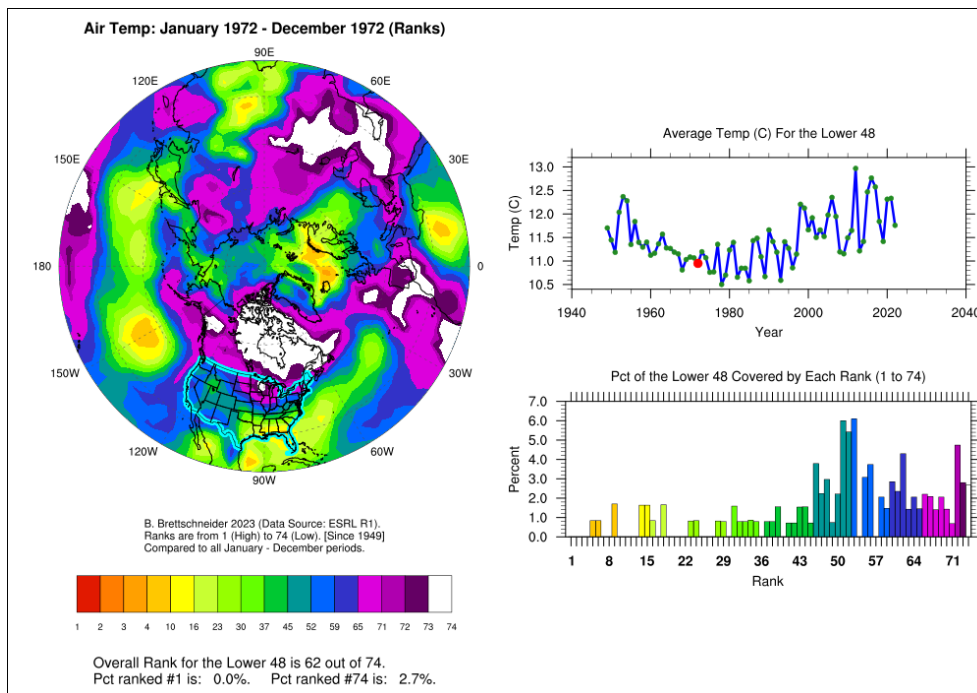
Description: This is a global ranking of 850 mb U-winds for November 2015 compared against all other Novembers. In the Nino 3.4 Region, it was the 3rd largest average November U-wind value behind only 1983 and 1998 (since 1949).

Example 5: Global Jan-Dec 1972 Air Temp Ranks Since 1949. Time Series is the Lower 48.

Use default values, except

- Layer to map (Choose Theme) is 1 (Air Temp).
- Bounding Coordinates for Rank Computation: In this section, select Option 2 (Lower 48) in the "Use Pre-Loaded Shapefile" dropdown. The bounding coordinates boxes are ignored.
- Last Month is 12 for December and Number of Months is 12 for January-December.
- Year of last month of assessment is 1972.
- May Type is 2 (North Polar).
- Central Longitude is 270 (90W).
- Year range for trend analysis Start year is 999. (This is a default value for all themes.)

Run time: 1:10



Link to image: http://data.61n150w.com/images/1972_1_12_12_0_0_2_5_-5_190_240_1_2_panel.png

Link to image (without time series): http://data.61n150w.com/images/1972_1_12_12_0_0_2_5_-5_190_240_1_2.png

Link to higher resolution image: http://data.61n150w.com/images/1972_1_12_12_0_0_2_5_-5_190_240_1_2_big.png

Link to csv time series: http://data.61n150w.com/images/1972_1_12_12_0_0_2_5_-5_190_240_1_2_values.txt

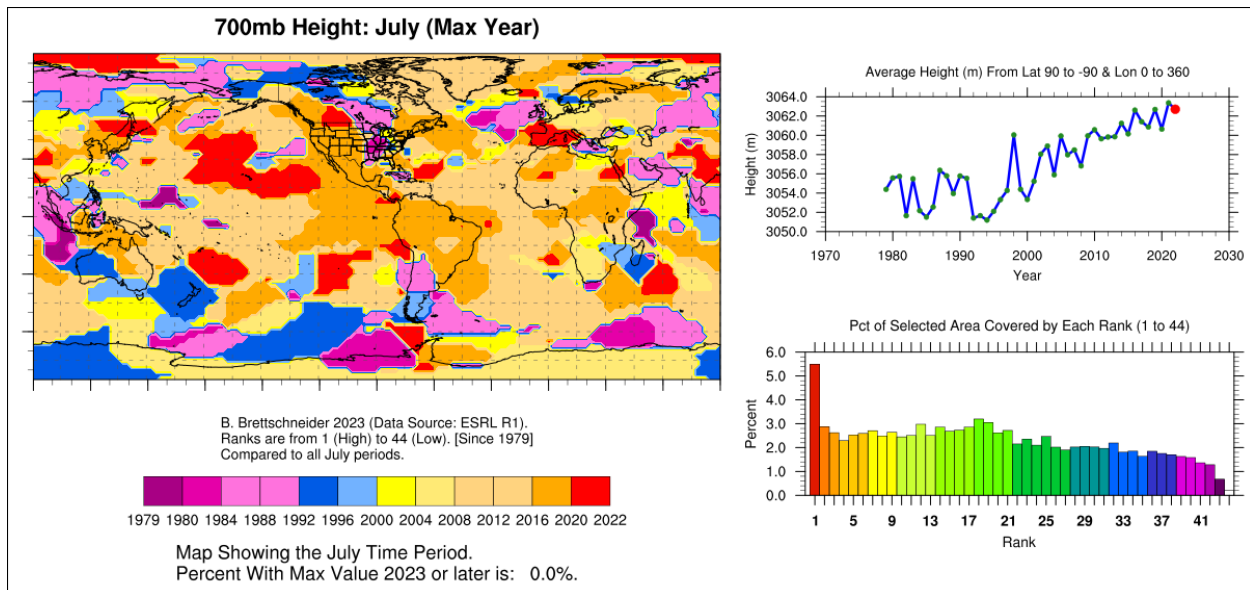
Description: Map showing the global rank in 1972 annual temperature compared to all other years (1949-2022). The map is centered over the North Pole and central longitude is 270E (90W). Note how the Lower 48 is highlighted in blue. The time series and frequency distribution is for this region only.

Example 6: Year with highest July 700 mb Height Since 1979. Time Series Global.

Use default values, except

- Layer to map (Choose Theme) is 11 (Height at Pressure Level).
- Lower Pressure Level is 3 for 700 mb.
- Bounding Coordinates for Rank Computation (mostly for time series) is 90 to -90 and 0 to 360.
- Last Month is 7 for July and Number of Months is 1 for just July.
- Year of last month of assessment is 2022. (Just making sure it's not in the future.)
- Map Type is 1 (Cylindrical).
- Year range for trend analysis Start year is 1979. (Beginning of satellite era.)
- Analysis Type is 2 (Max Year)

Run time: 1:30



Link to image: http://data.61n150w.com/images/2022_11_7_1_3_0_1_90_-90_0_360_2_0_panel.png

Link to image (without time series): http://data.61n150w.com/images/2022_11_7_1_3_0_1_90_-90_0_360_2_0.png

Link to higher resolution image: http://data.61n150w.com/images/2022_11_7_1_3_0_1_90_-90_0_360_2_0_big.png

Link to csv time series: http://data.61n150w.com/images/2022_11_7_1_3_0_1_90_-90_0_360_2_0_values.txt

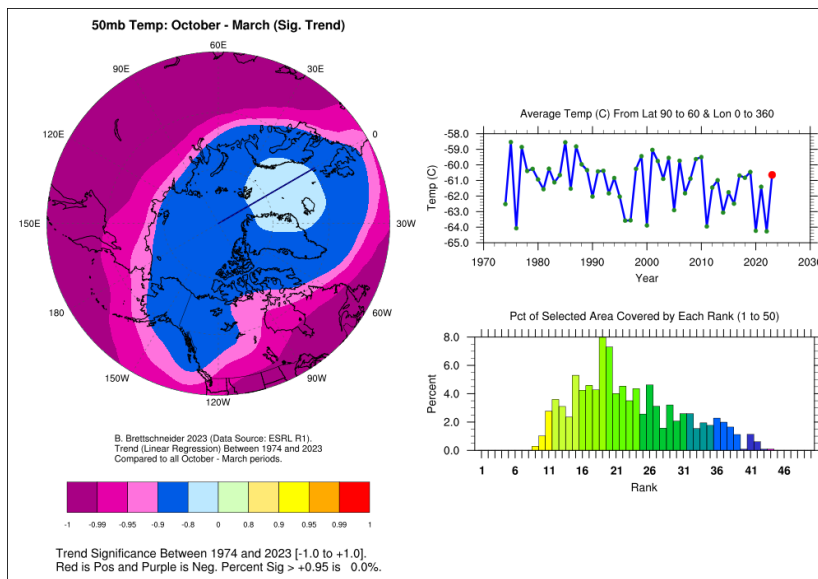
Description: The Max or Min maps can be tough to view since the color scales go from early years to recent years and the gradient between colors can be odd looking. Anyway, red areas are the most recent years and purple areas are the most distant years. Remember that we chose 1979 as our start year.

Example 7: 50-Year Trend in Oct-Mar 50 mb Temps. Time Series is 60N-90N.

Use default values, except

- Layer to map (Choose Theme) is 12 (Temp at Pressure Level).
- Lower Pressure Level is 13 for 50 mb.
- Bounding Coordinates for Rank Computation (mostly for time series) is 90 to 60 and 0 to 360.
- Last Month is 3 for March and Number of Months is 6 for Oct-Mar.
- Year of last month of assessment is 2023.
- May Type is 2 (North Polar).
- Year range for trend analysis Start year is 1974. (1973-74 to 2022-23)
- Analysis Type is 4 (Trend)
- Central Longitude is 240 and Low Latitude is 45.

Run time: 0:57



Link to image: http://data.61n150w.com/images/2023_12_3_6_13_0_2_90_60_0_360_4_0_panel.png

Link to image (without time series):

http://data.61n150w.com/images/2023_12_3_6_13_0_2_90_60_0_360_4_0.png

Link to higher resolution image:

http://data.61n150w.com/images/2023_12_3_6_13_0_2_90_60_0_360_4_0_big.png

Link to csv time series: http://data.61n150w.com/images/2023_12_3_6_13_0_2_90_60_0_360_4_0_values.txt

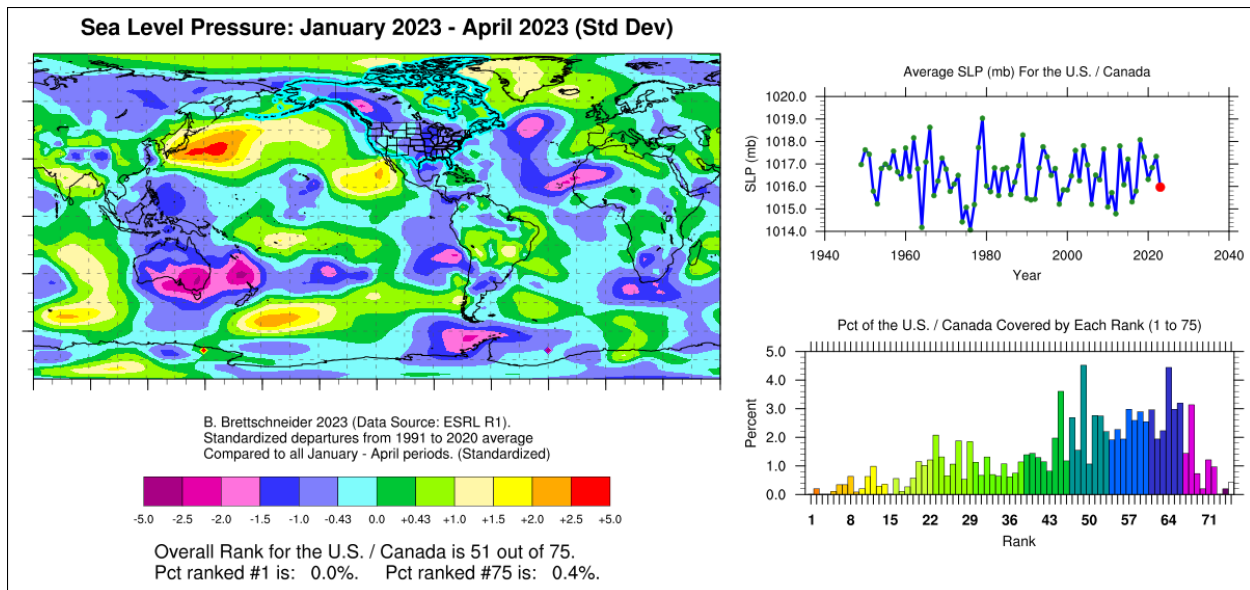
Description: This shows the statistical significance of the 50 mb temp trend for the last 50 Oct-Mar periods. The map shows P-values (not trend amounts). For example, the lights shade of purple is interpreted as "decreasing at the 90th percent confidence level." The time series and bar chart is for the entire 60N to 90N region.

Example 8: Jan-Apr 2023 Sea Level Pressure Standardized Departure. Time Series is Alaska.

Use default values, except

- Layer to map (Choose Theme) is 10 (SLP).
- Bounding Coordinates for Rank Computation (mostly for time series): In this section, select Option 3 (U.S./Canada) in the "Use Pre-Loaded Shapefile" dropdown. The bounding coordinates boxes are ignored.
- Last Month is 4 for April and Number of Months is 4 for Jan-Apr.
- Begin Climo is 1991 and End Climo is 2020.
- Year of last month of assessment is 2023.
- May Type is 1 (Cylindrical).
- Year range for trend analysis Start year is 999. (This is a default value for all themes.)
- Analysis Type is 5 (std. dev.)

Run time: 1:30



Link to image: http://data.61n150w.com/images/2023_10_4_4_0_0_1_90_60_0_360_5_3_panel.png

Link to image (without time series):

http://data.61n150w.com/images/2023_10_4_4_0_0_1_90_60_0_360_5_3.png

Link to higher resolution image:

http://data.61n150w.com/images/2023_10_4_4_0_0_1_90_60_0_360_5_3_big.png

Link to csv time series: http://data.61n150w.com/images/2023_10_4_4_0_0_1_90_60_0_360_5_3_values.txt

Description: This map shows the average Jan-April 2023 mean sea level pressure as a departure from the 1991-2020 average, but in standard deviations (not raw value departures). The values +0.43 and -0.43 are used because for normally distributed data, they represent the upper and lower tercile thresholds. Note that the U.S./Canada are outlined in light blue. The time series and frequency histogram are for this region. The time series shows the average values, not average standardized departures.