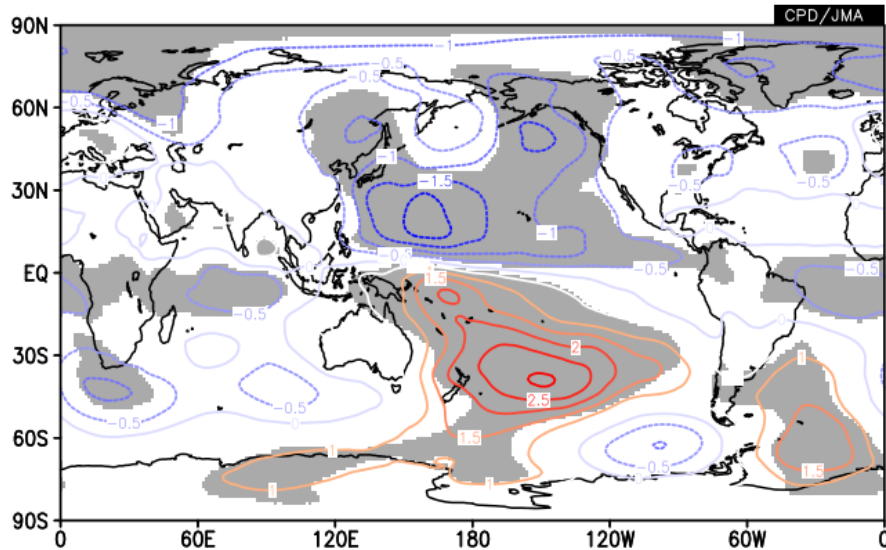
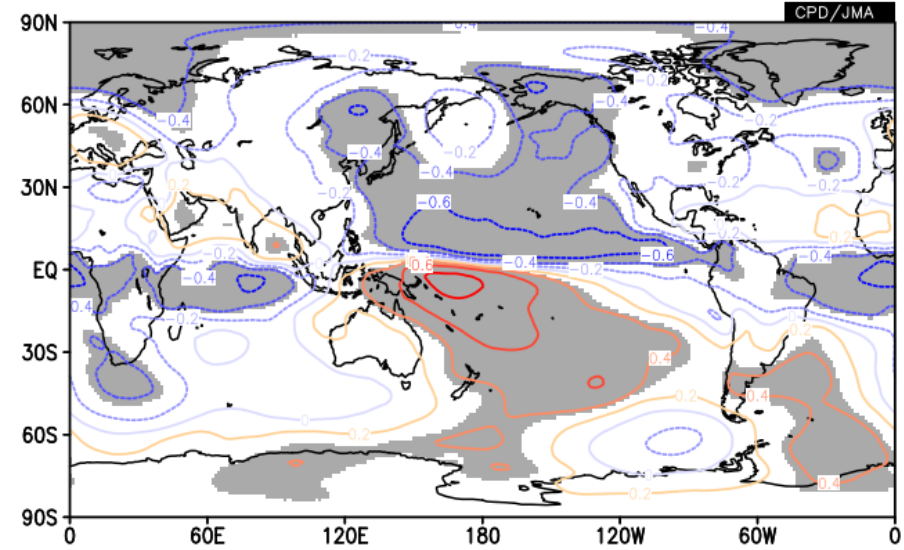


Regression and Correlation Analysis

DATA1 JRA-55 psi37 ANOM lat = -90:90 lon = 0:360 level = 7:7
time = 1979090100:2010090100 ave = 1YR(1*1MO)
DATA2 INDEX nino.3 ANOM lat = -90:90 lon = 0:360 level = 1:1
time = 1979090100:2010090100 ave = 1YR(1*1MO) analysis method = REGRES!



DATA1 JRA-55 psi37 ANOM lat = -90:90 lon = 0:360 level = 7:7
time = 1979090100:2010090100 ave = 1YR(1*1MO)
DATA2 INDEX nino.3 ANOM lat = -90:90 lon = 0:360 level = 1:1
time = 1979090100:2010090100 ave = 1YR(1*1MO) analysis method = CORREL!



Left: regression coefficients; right: coefficient of correlation between NINO.3 SST anomalies and 850-hPa stream function anomalies

The contours show regression and correlation coefficients, and shading indicates a 95% confidence level.

- Create a regression and correlation coefficient map.

Regression and Correlation Analysis

Analysis Dataset

Select parameters | Graphic Options

1 Dataset: JRA-55

2 Element: Pressure Levels
ψ (Stream Function)

3 Data type: ANOM

4 Area: ALL
Lat: -90 - 90 Ave ☐
Lon: 0 - 360 Ave ☐

5 Level: 850hPa - 850hPa

6 Time unit: MONTHLY
☐ Ave ☒ Year-to-year ☐ Time filter

7 Showing period: RANGE
1979 - 2010
9 - 9

Analysis method: -Analysis method-

☐ Use parameter code

“Year-to-year” must be checked for regression and correlation coefficient map creation.

1. Dataset: JRA-55

2. Element: “Pressure Levels” -> “ψ (Stream Function)”

3. Data type: ANOM

4. Area: ALL

5. Level: 850hPa

6. Time unit: MONTHLY

Check “Year-to-year” to create a regression and correlation coefficient map.

7. Showing period: “1979”–“2010”, “9”–“9”

Regression and Correlation Analysis

Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels ψ (Stream Function)	ANOM	ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/>	850hPa - 850hPa	MONTHLY <input type="checkbox"/> Ave <input checked="" type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 1979 - 2010 9 - 9

☐ Vector ☐ SD
Derivative: ☐ lon ☐ lat

Analysis method: **REGRESSION_COEFFICIENT**

Data2

Dataset	Element	Data type	Time unit	Lag	Significance
INDEX	NINO.3 <input type="checkbox"/> SD	ANOM	MONTHLY <input type="checkbox"/> Ave <input checked="" type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	0 YEAR	95%(two side) 90%(two side) 95%(two side) 99%(two side) 90%(one side, upper) 95%(one side, upper) 99%(one side, upper)

Select “REGRESSION_COEFFICIENT” as the “Analysis method”.

1. Dataset: INDEX

2. Element: NINO.3

3. Data type: ANOM

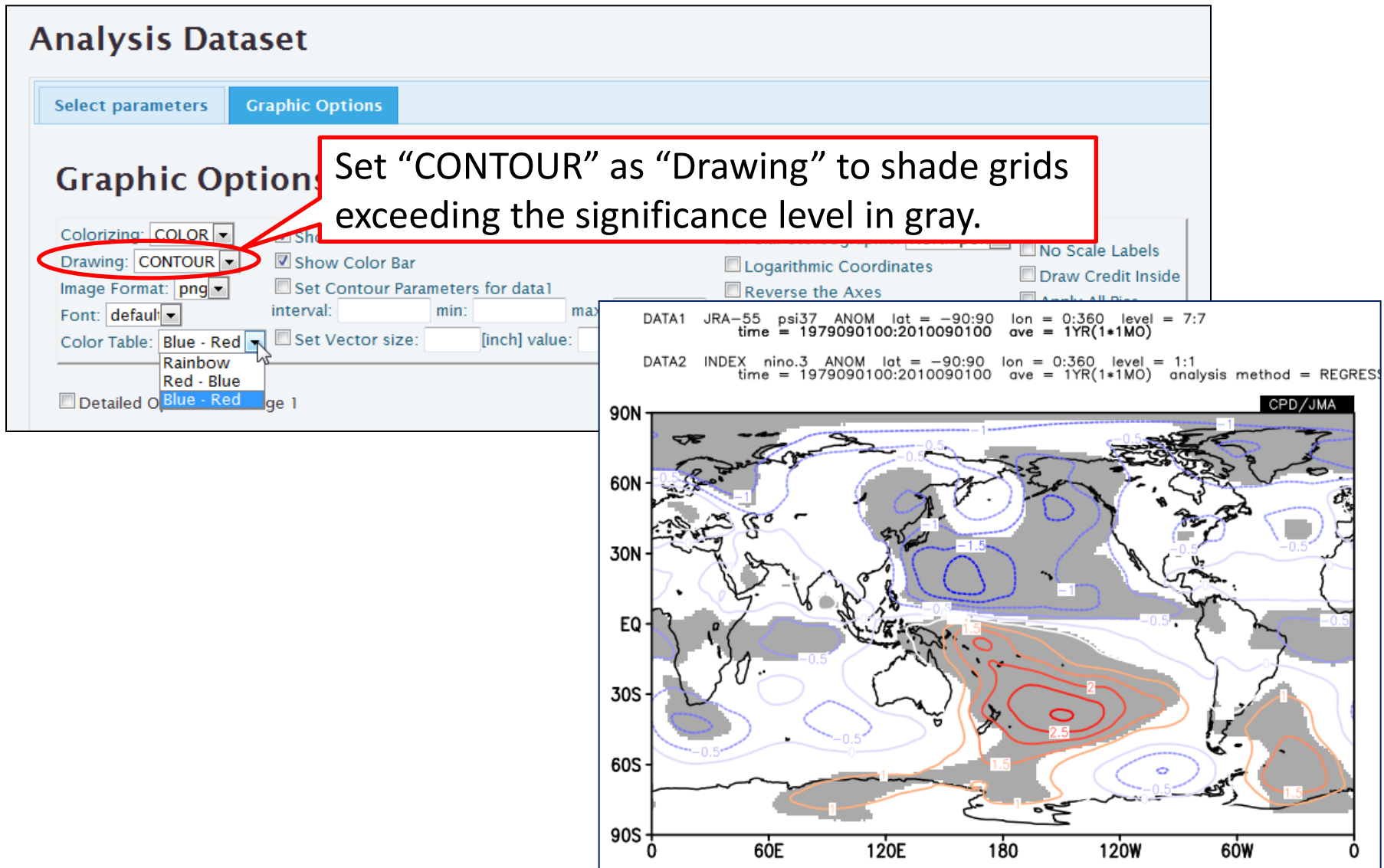
4. Time unit: MONTHLY

Check “Year-to-year” to create a regression and correlation coefficient map.

5. Significance: “95% (two side)”

Significance testing based on t-testing can be used in analysis.

Regression and Correlation Analysis



- Set contour and shading properties to show the significance level.

Regression and Correlation Analysis

Analysis Dataset

Select parameters

Graphic Options

Data1

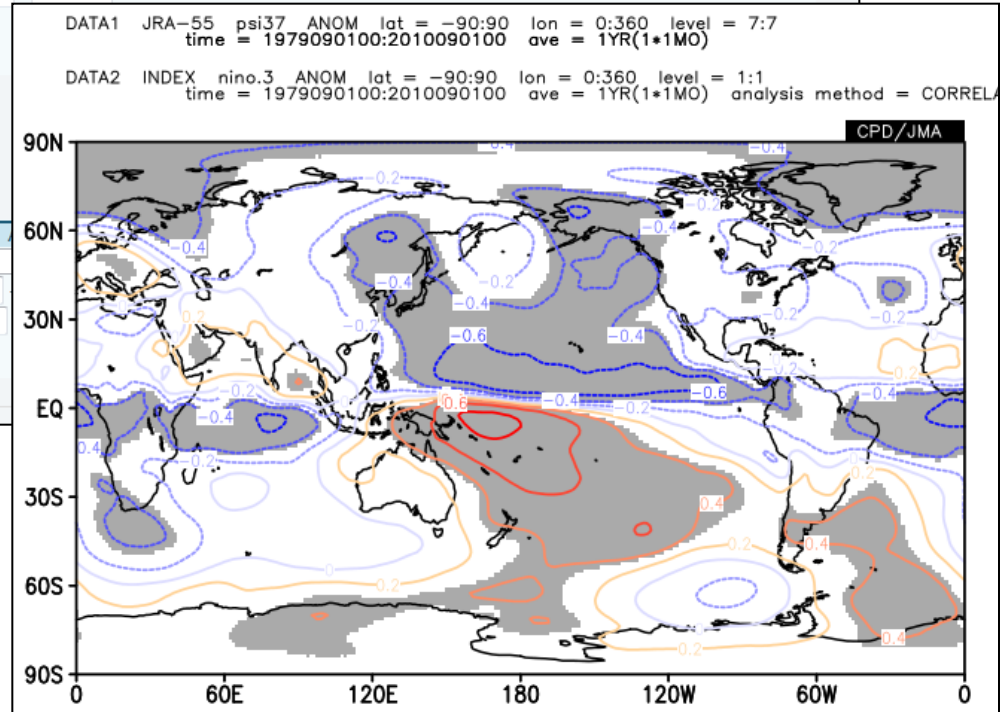
Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels ψ (Stream Function)	ANOM	ALL Lat: -90 - 90 Lon: 0 - 360	850hPa - 850hPa	MONTHLY <input type="checkbox"/> Ave <input checked="" type="checkbox"/> Year-to-year <input type="checkbox"/> Time filter	RANGE 1979 - 2010 9 - 9

☐ Vector ☐ SD
Derivative: ☐ lon ☐ lat

Analysis method: CORRELATION_COEFFICIENT

Data2

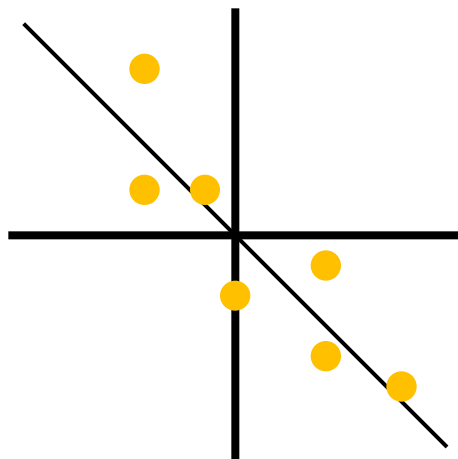
Dataset	Element	Data type	Area
INDEX	NINO.3 <input type="checkbox"/> SD	ANOM	ALL Lat: -90 Lon: 0



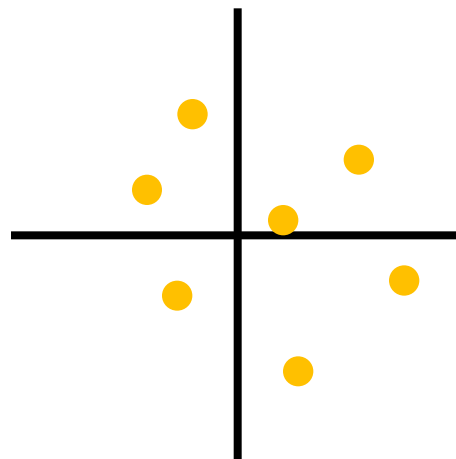
- For correlation analysis, select “CORRELATION ANALYSIS” as the “Analysis method”.

Regression and correlation analysis

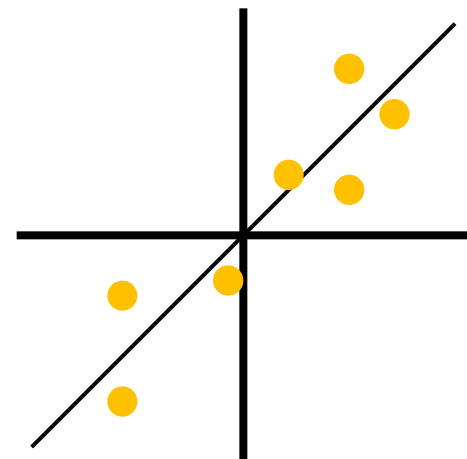
- Regression and correlation analysis are often used to examine climatological systems such as teleconnections.
- The term “correlation coefficient” refers to the degree of the correlation, and “regression coefficient” refers to the gradient of the regression line.
 - A correlation coefficient of around +1 or -1 represents a clear linear correlation between the targeted data, and a value of around zero indicates a weak correlation.



Negative correlation



No correlation



Positive correlation