ITACS

Climate Prediction Division, JMA

menu

- What’s ITACS
- Data
- Application to use
- Exercise and learning by using ITACS

What's ITACS

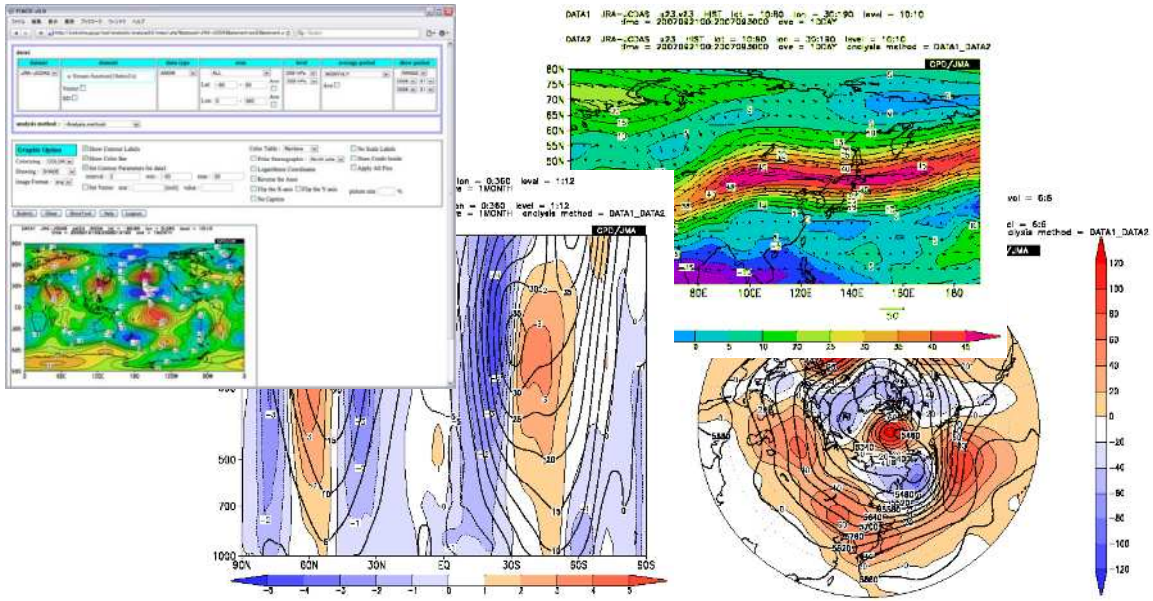
ITACS is the Interactive Tool for Analysis of Climate System since 2007.

Aim:

Analyzing the causes of climate events and monitoring current climate status.

System:

Web interface + programs(Ruby, Gphys…) + GrADS + data files on the web server



data

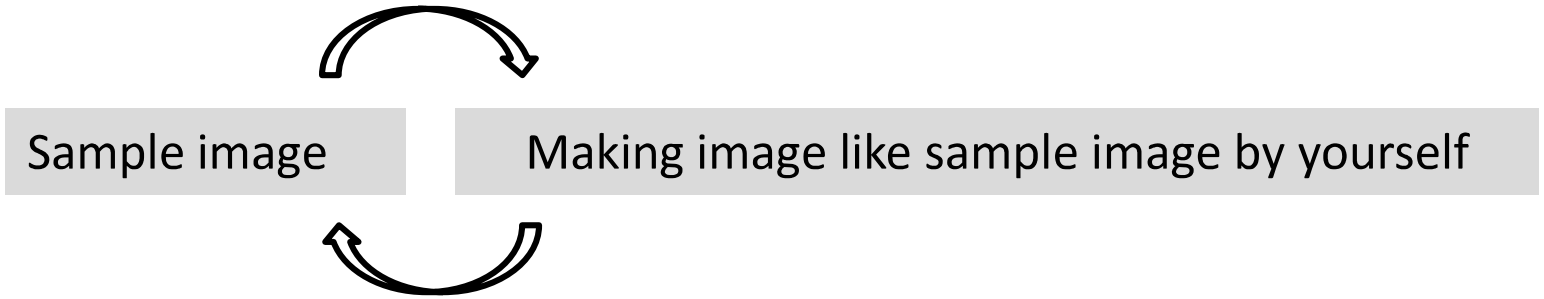
- CLIMAT
  - Monthly world climate data derived from CLIMAT messages via the GTS line from WMO Members around the world.
- INDEX
  - El Nino Monitoring Indices consisting of monthly mean Sea Surface Temperature produced by COBE-SST.
- JRA-JCDAS
  - Atmospheric circulation data produced by JMA's Climate Data Assimilation System (JCDAS), which is consistent quality with Japanese 25-year reanalysis (JRA-25).
- MOVE-G
  - Oceanic assimilation produced by the system operated by JMA.
- SAT
  - Outgoing Longwave Radiation (OLR), which is derived from observations by NOAA's polar orbital satellites, and provided by Climate Prediction Center (CPC) in the National Centers for Environmental Prediction (NCEP) of the National Oceanic and Atmospheric Administration (NOAA).
- SST
  - Sea Surface Temperature produced by the system operated by JMA (COBE-SST).

Application to use

There is banner link about application to use ITACS in the TCC homepage:
http://ds.data.jma.go.jp/tcc/tcc/index.html

Exercise

Now, let's access and use ITACS. Using it will help you to understand ITACS.



If we have enough time after every exercises…

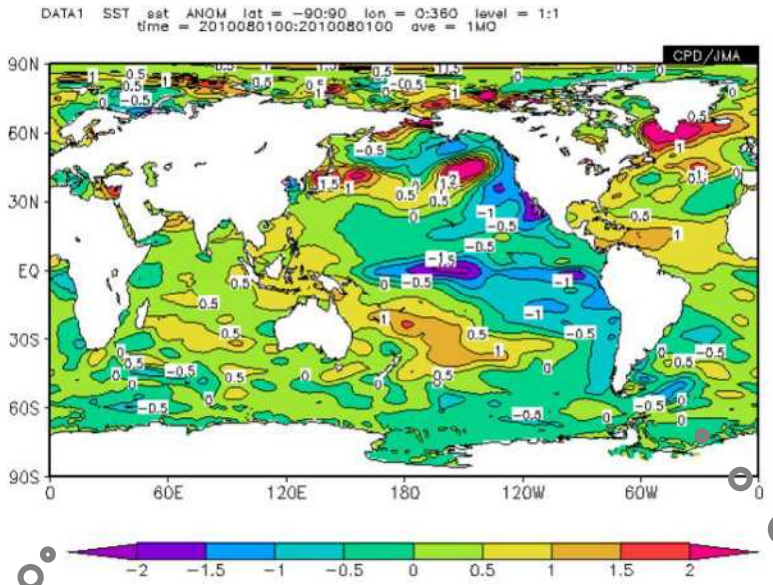
Let's try to change sample image as you like (self study)

Let's start exercise. Please access to following site:

http://extreme.kishou.go.jp/tool/itacs-tcc2011/

Appendix) Self study

Let’s try to draw maps as you like if you know basic use of ITACS.
For example, you can make a map around your country…

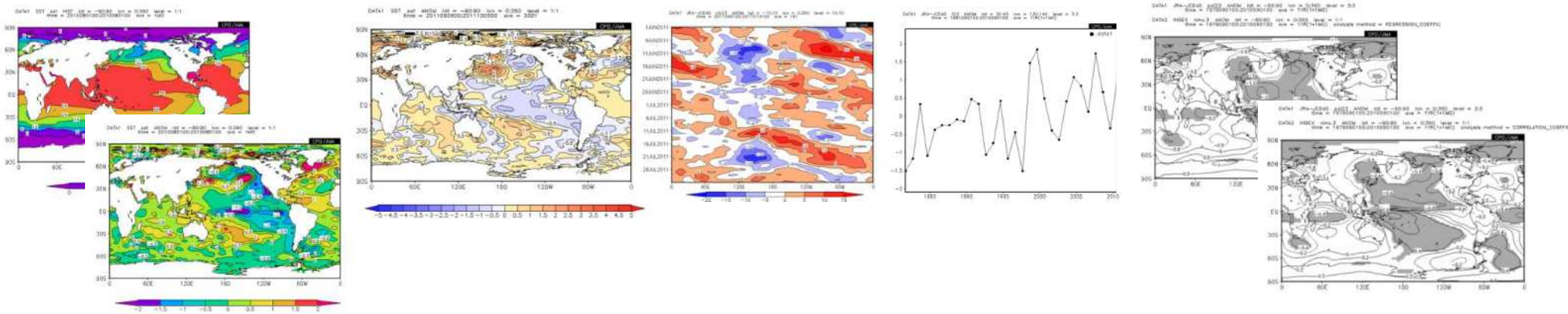


Season
Summer or winter

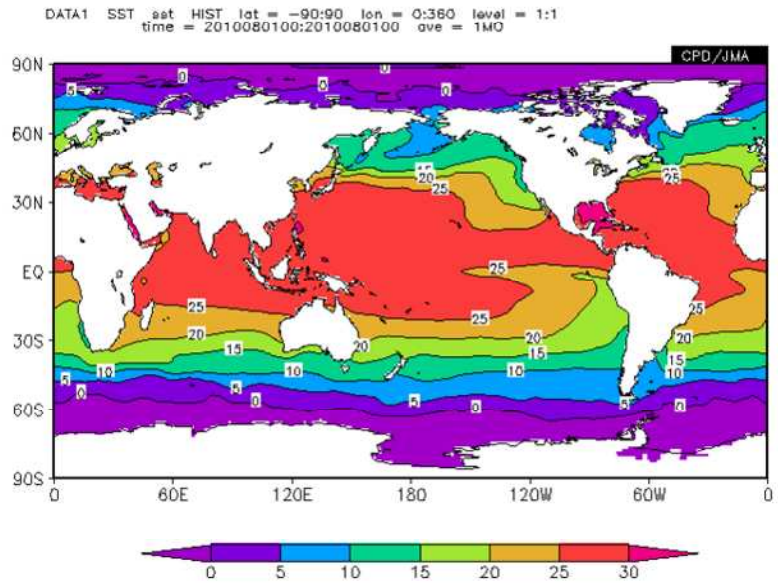
area

Index of today's Exercise

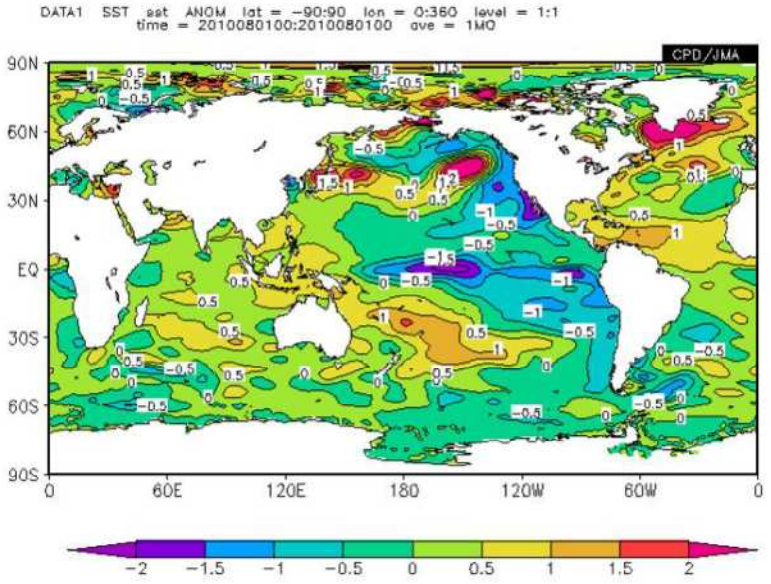
- Sea surface temperature(SST)
- Average of SST anomaly
- Time-longitude cross section of 200-hPa velocity potential
- Interannual variation of monthly mean 850-hPa air temperature
- Regression Analysis and Correlation Analysis



Sea surface temperature(SST)



Sea Surface Temperature in August 2010

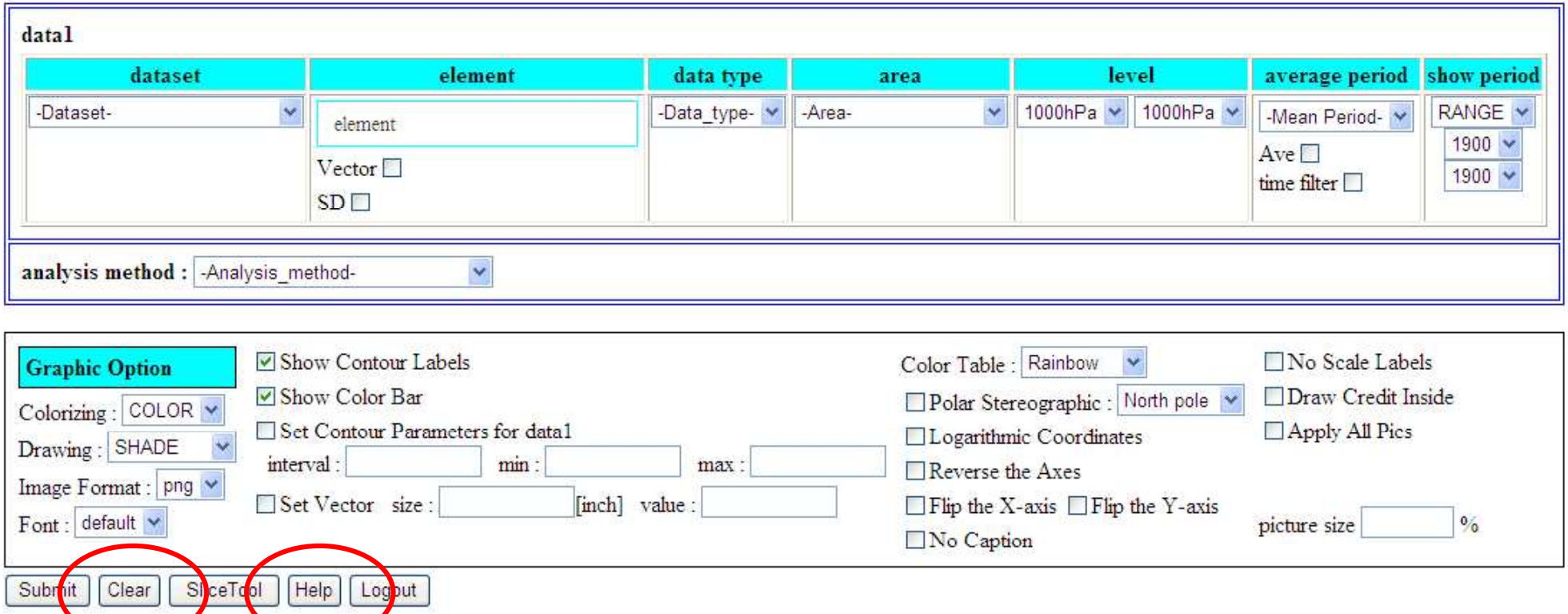


Sea Surface Temperature anomaly in August 2010

This is tutorial for making a map of Sea Surface Temperature(SST) and its anomaly. Let's know basic use of ITACS.

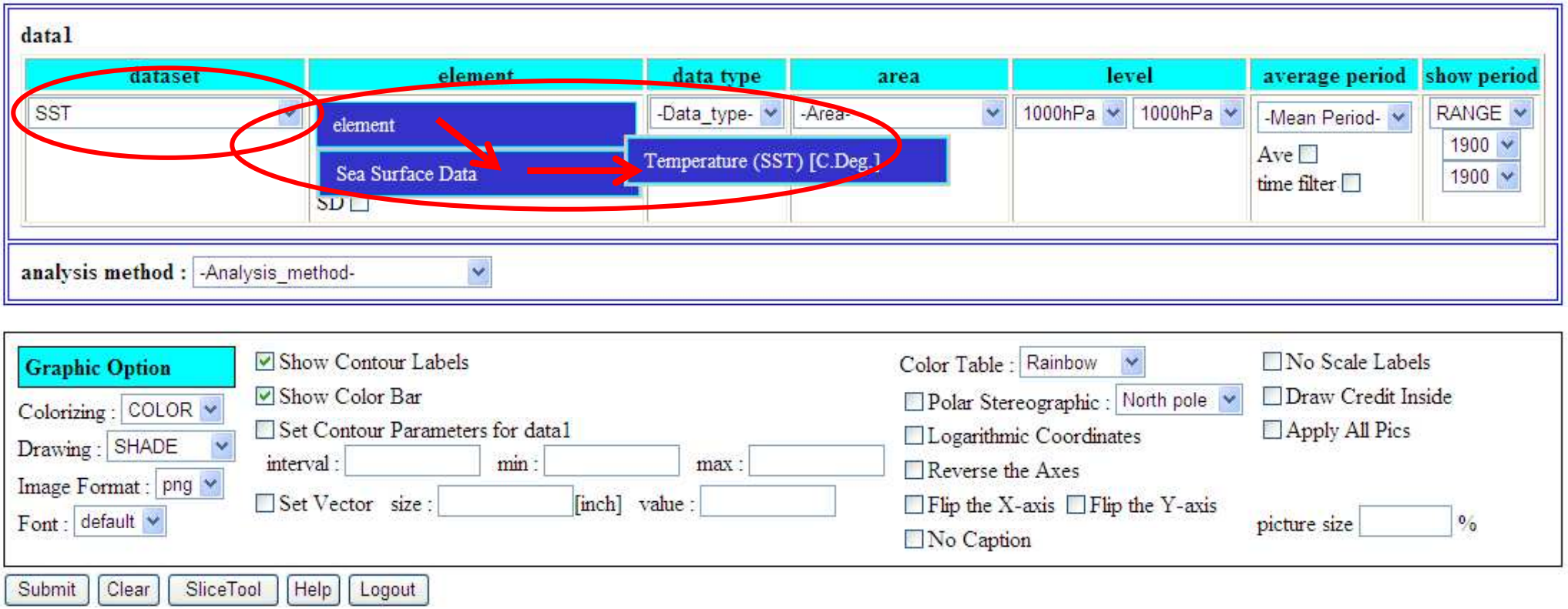
ITACSの基本的な使用方法を、SSTの実況値及び平年偏差の描画、カラーバーの変更方法などを通じて、学びます。

Sea surface temperature(SST)



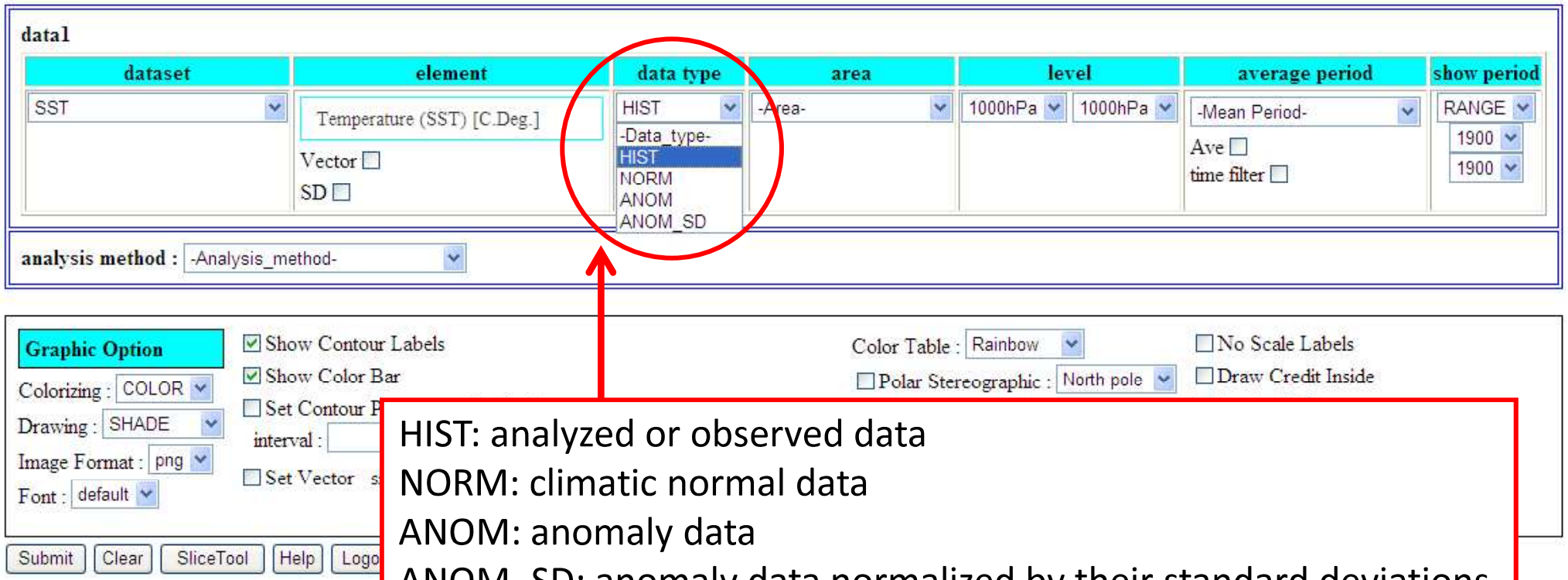
This is default screen of ITACS. Click “Clear” button if you need default screen.
“Help” button gives you help page.

Sea surface temperature(SST)



First, select “dataset” - “SST” and its “element” - “Temperature”.

Sea surface temperature(SST)

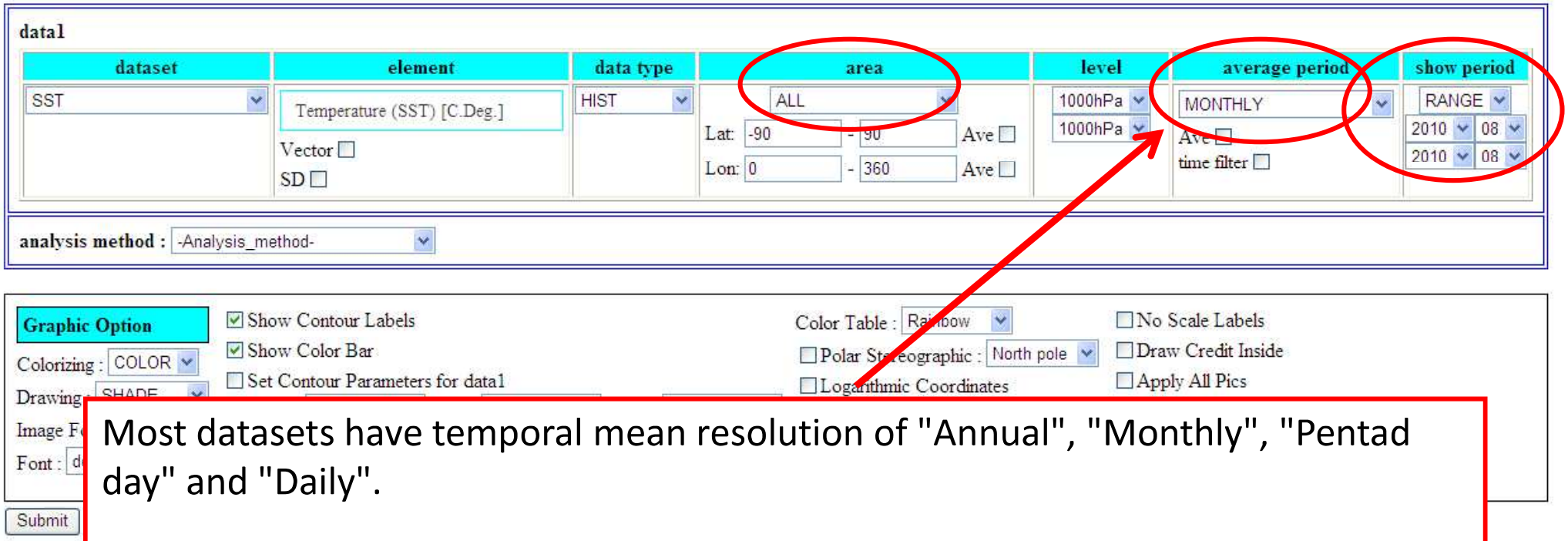


HIST: analyzed or observed data
NORM: climatic normal data
ANOM: anomaly data
ANOM_SD: anomaly data normalized by their standard deviations

Note:
"HIST" minus "NORM" is "ANOM"
"ANOM" divided by σ is "ANOM_SD"

Secondly, select “data type” - “HIST”(historical data).
Please note there are some data type.

Sea surface temperature(SST)

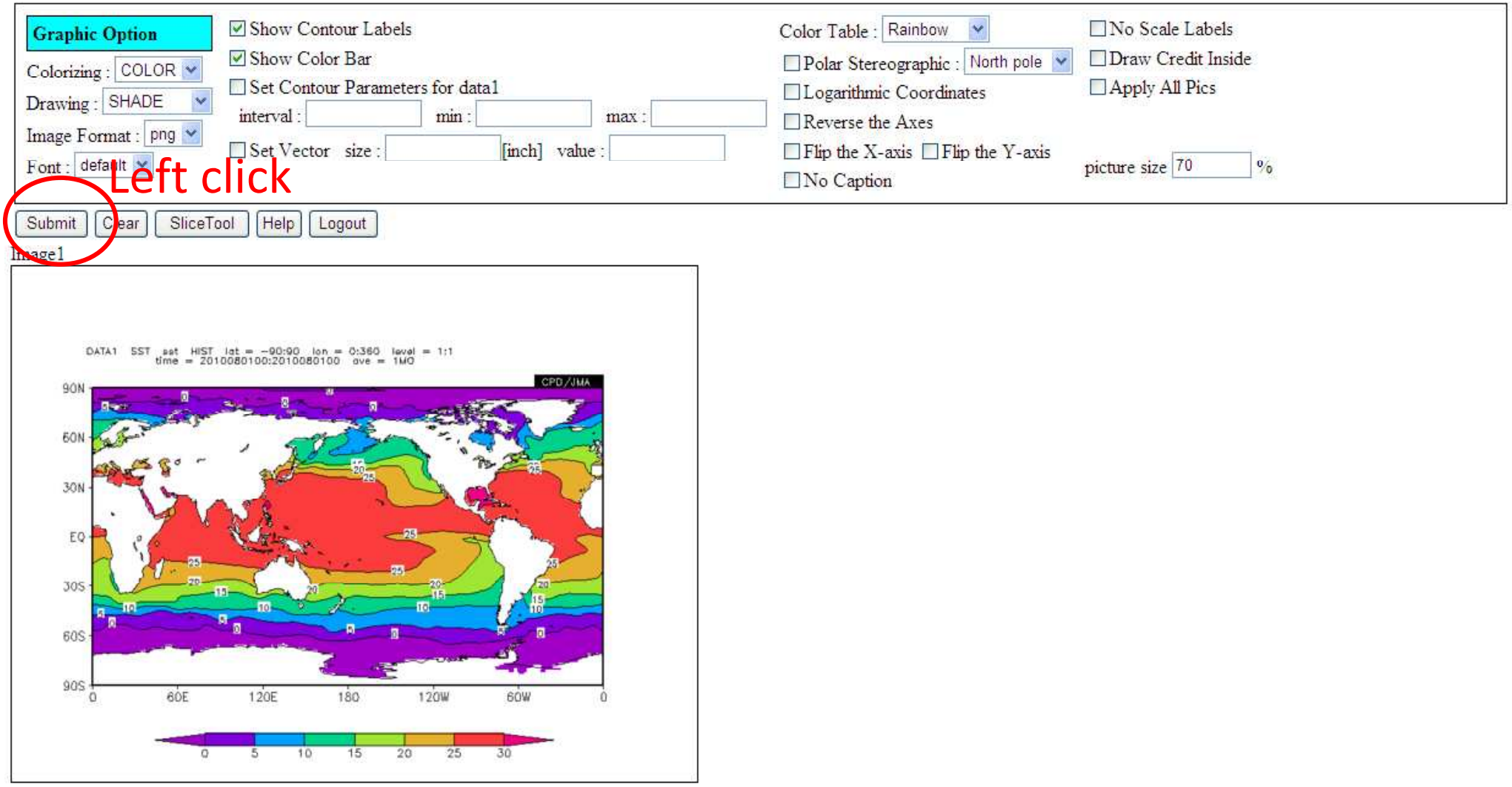


Most datasets have temporal mean resolution of "Annual", "Monthly", "Pentad day" and "Daily".

"Year average" means "Year average monthly" (For example, for showing values for DJF1979, DJF1980, DJF1981...,)

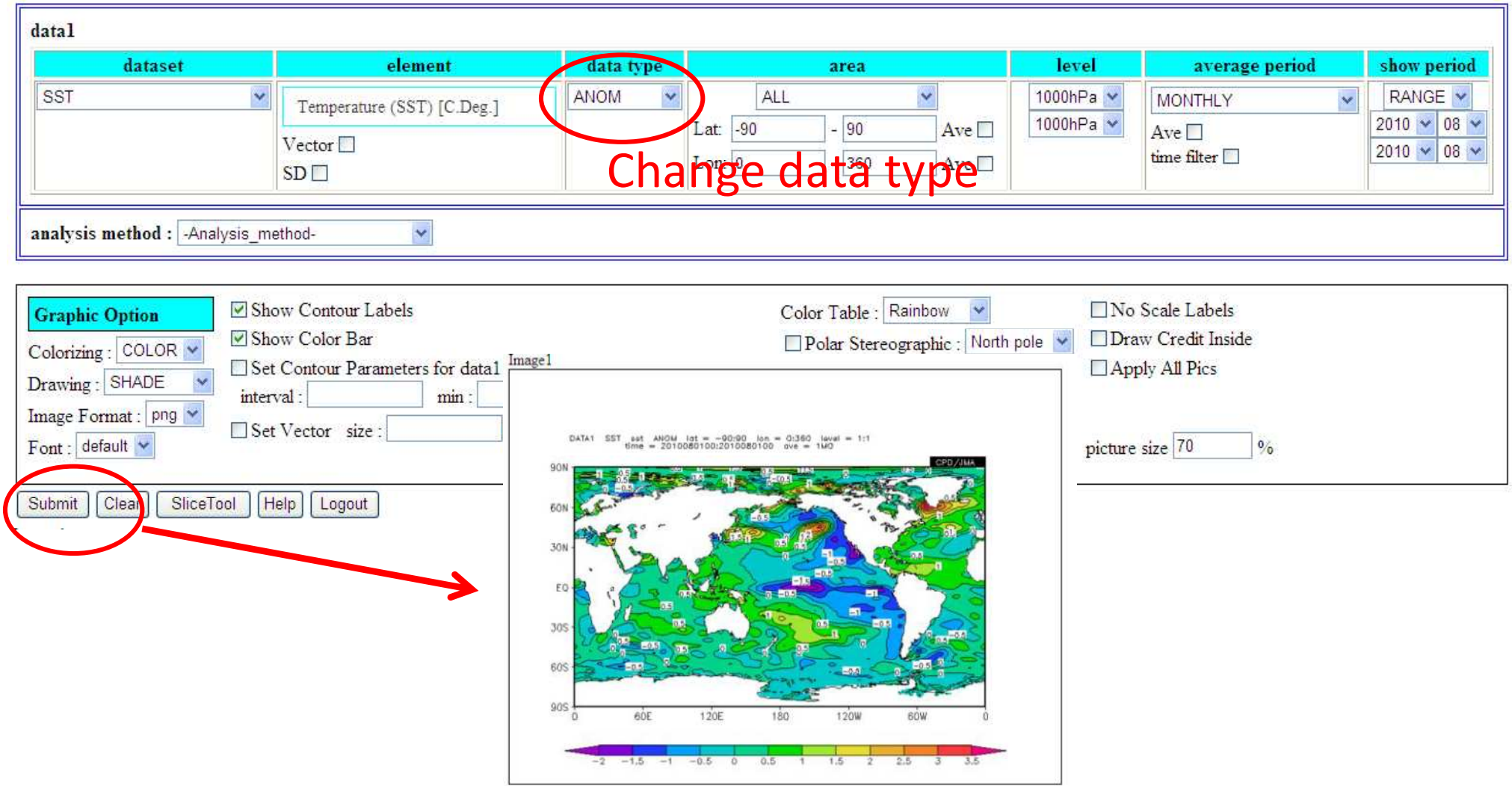
Next, select “area”, “average period” and “show period”.

Sea surface temperature(SST)



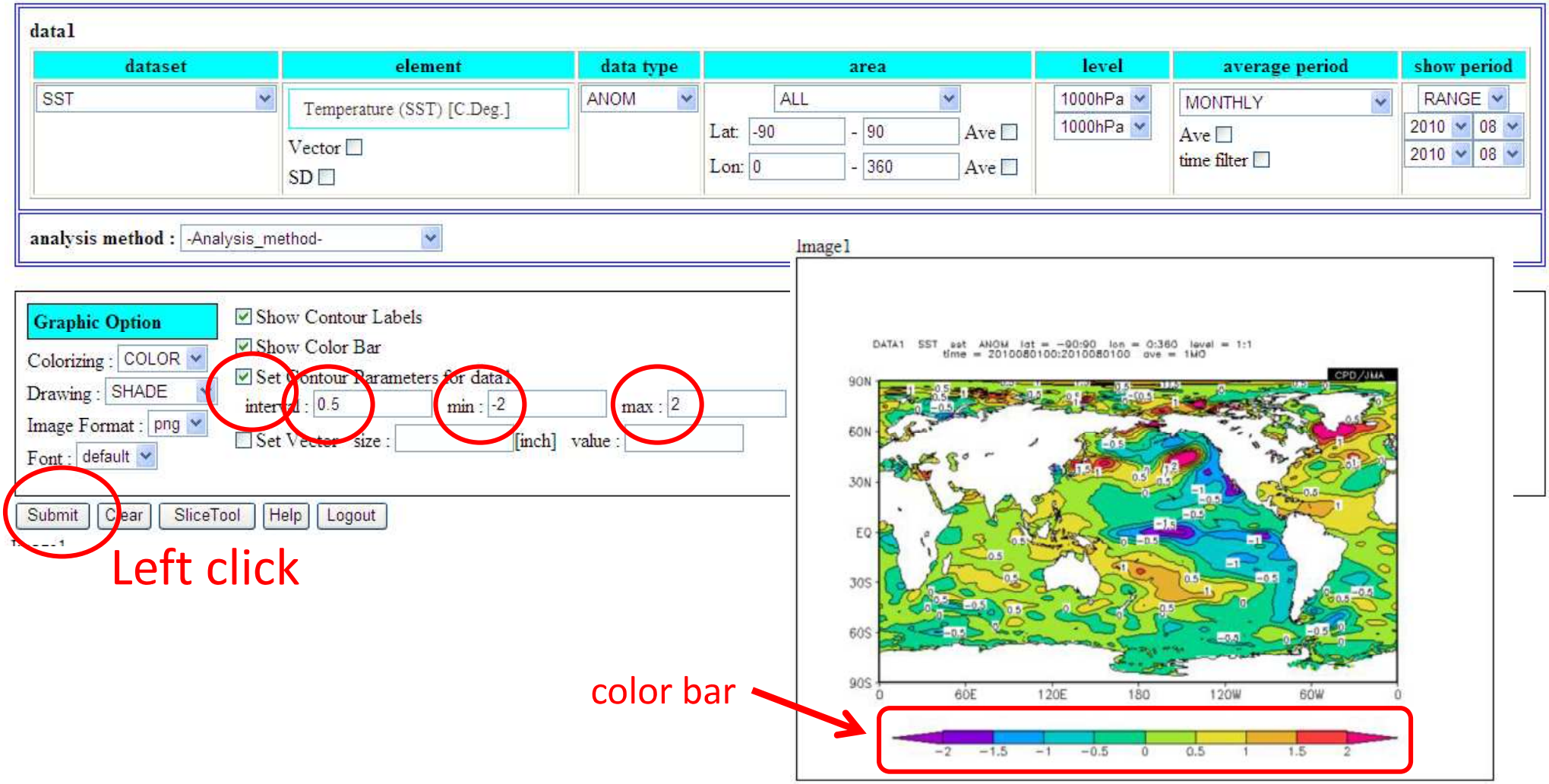
Finally, click “Submit” button. A map of Sea Surface Temperature(SST) will be made.

Sea surface temperature(SST) anomaly



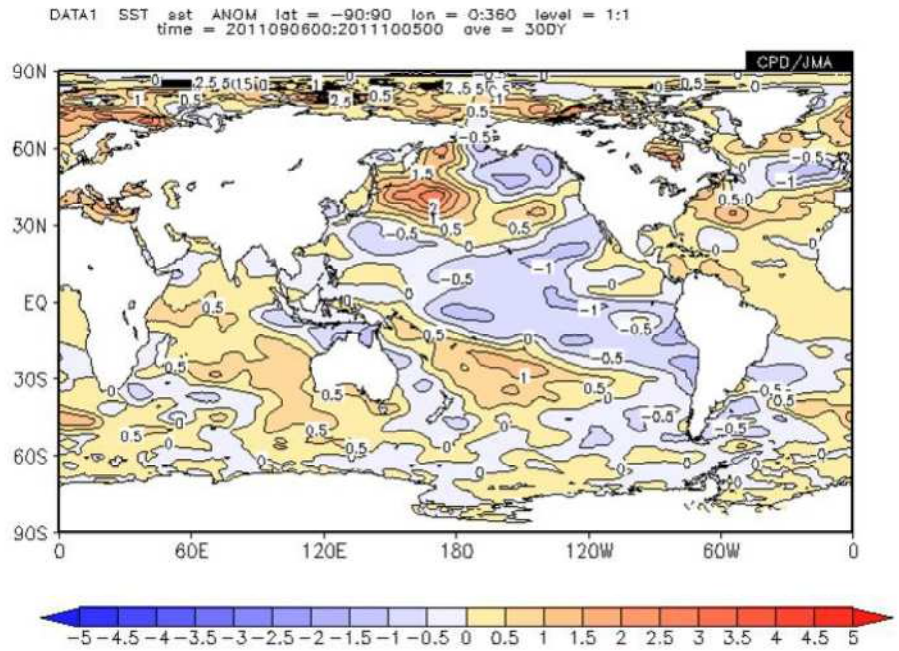
Let's change "data type" – "ANOM" to make map of SST anomaly and click "Submit".

Sea surface temperature(SST) anomaly



If you want to change the range of colors in the color bar, please use “Graphic Options”. Check “Set Contour Parameters for data1” and input parameters for interval, min and max of values.

Average of SST anomaly

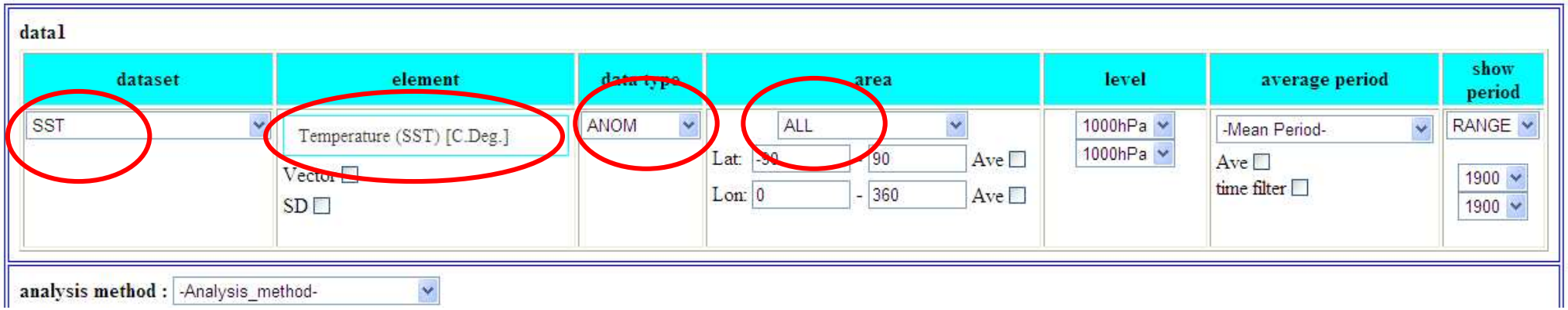


Average of SST anomaly between 6 September and 5 October

Let’s know how to figure out the average of daily data.

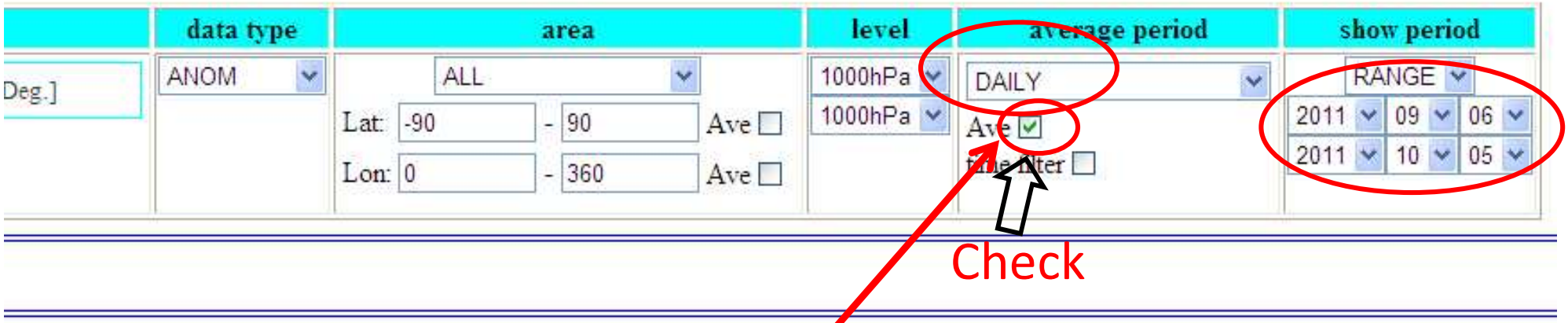
日別値の平均を描画する方法を学びます。

Average of SST anomaly



First, select “dataset” - “SST” and its “element” - “Temperature”.
And, select “data type” - “ANOM”(anomaly data) and “area” – “ALL”.

Average of SST anomaly

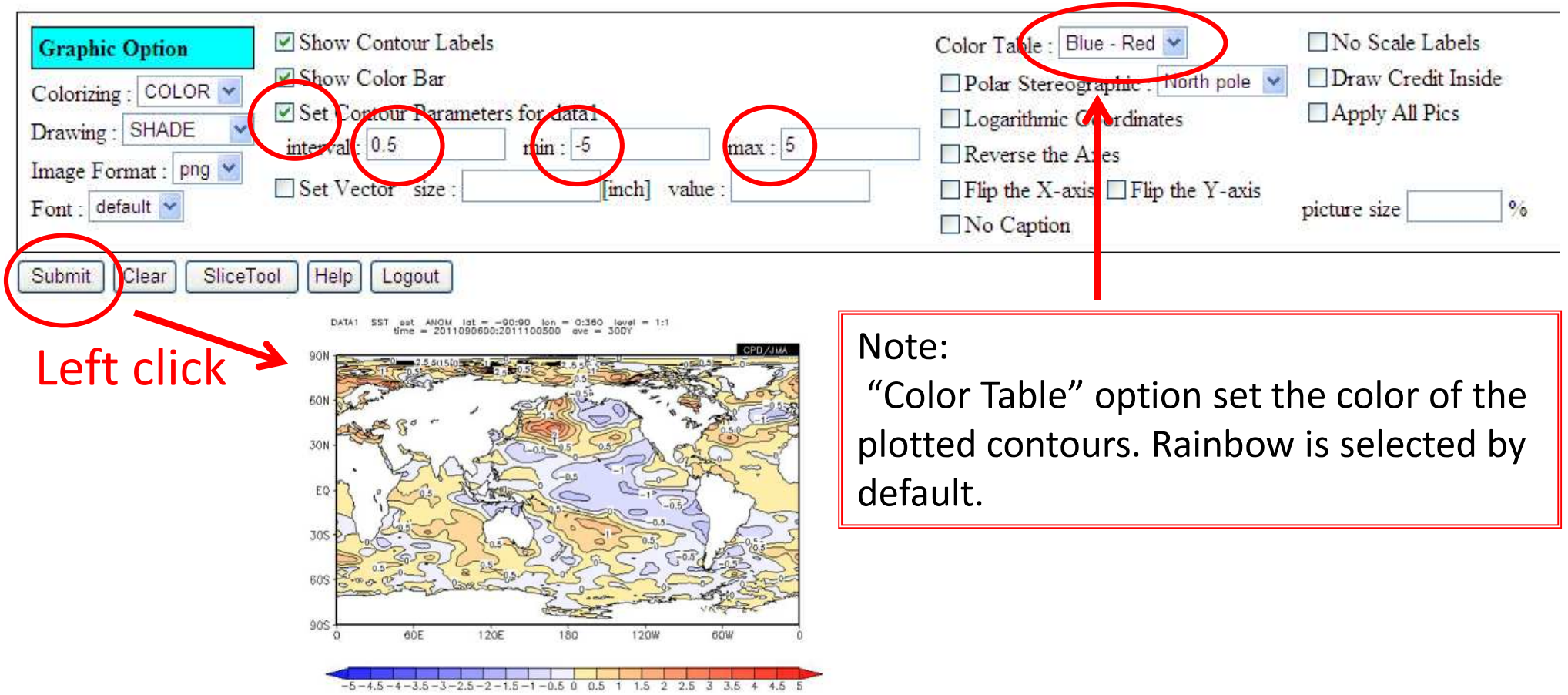


"Ave" gives average of data.

Note:
ITACS figures out the monthly data if you select "MONTHLY" in the "average period".

Next, please select "average period" – "DAILY" and check "Ave" – "ON(checked)".
And, select "show period"(2011.09.06 – 2011.10.05).

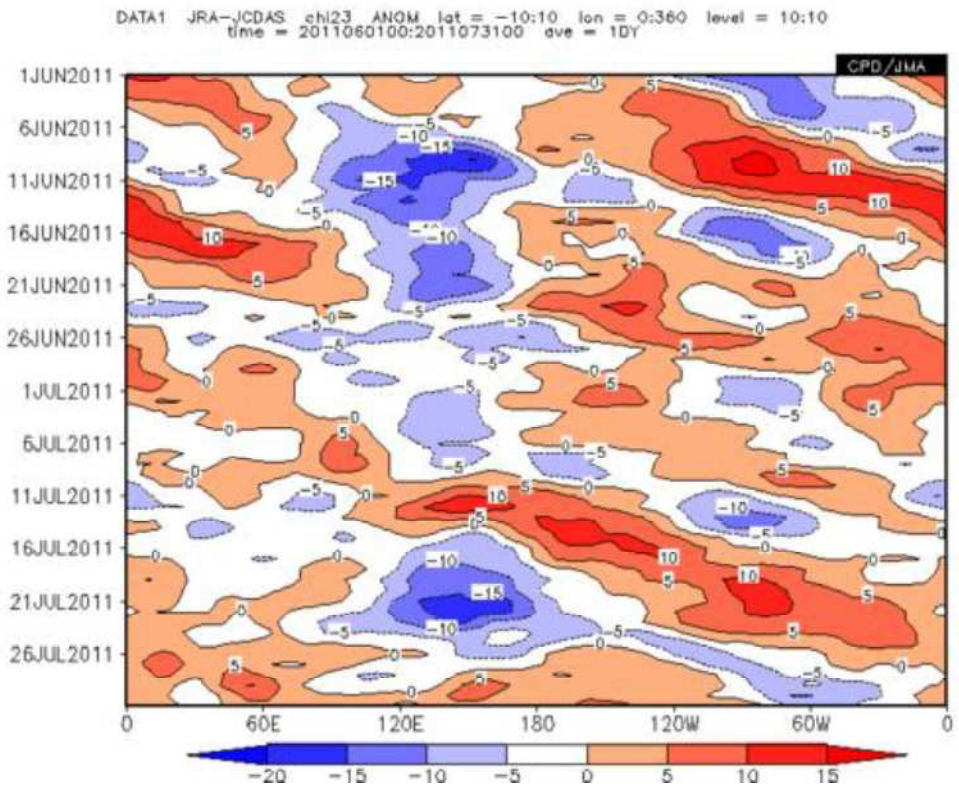
Average of SST anomaly



Note:
"Color Table" option set the color of the plotted contours. Rainbow is selected by default.

Finally, please select "Set Contour Parameters" of Graphic Option. Let's change "Color Table" if you want to set the color of the plotted contours. And, click "Submit".

Time-longitude cross section of 200-hPa velocity potential



Time-longitude cross section of 200-hPa velocity potential

Let’s know how to draw time-longitude cross section of data.

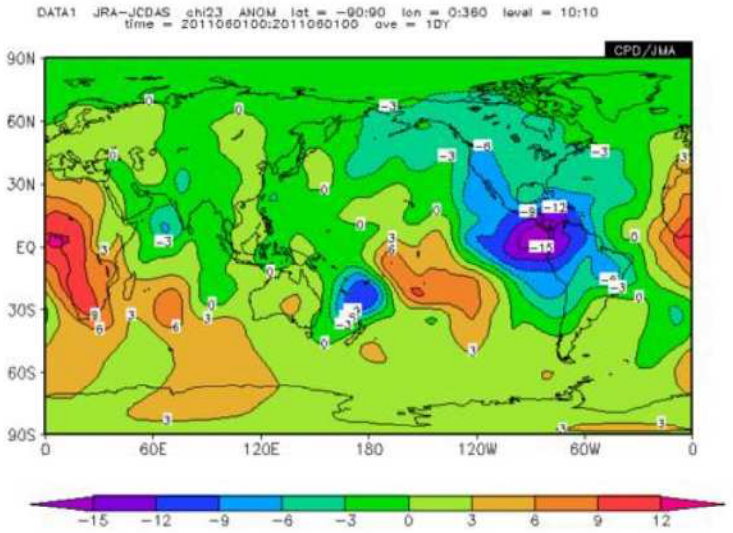
経度-時間断面図を描画する方法を学びます。

Time-longitude cross section of 200-hPa velocity potential

data1

dataset	element	data type	area	level	average period	show period
JRA-JCDAS	X (Velocity Potential) [10^6m^2/s] Vector ☐ SD ☐	ANOM	ALL Lat: -90 - 90 Ave ☐ Lon: 0 - 360 Ave ☐	200hPa 200hPa	DAILY Ave ☐ time filter ☐	RANGE 2011 06 01 2011 06 01

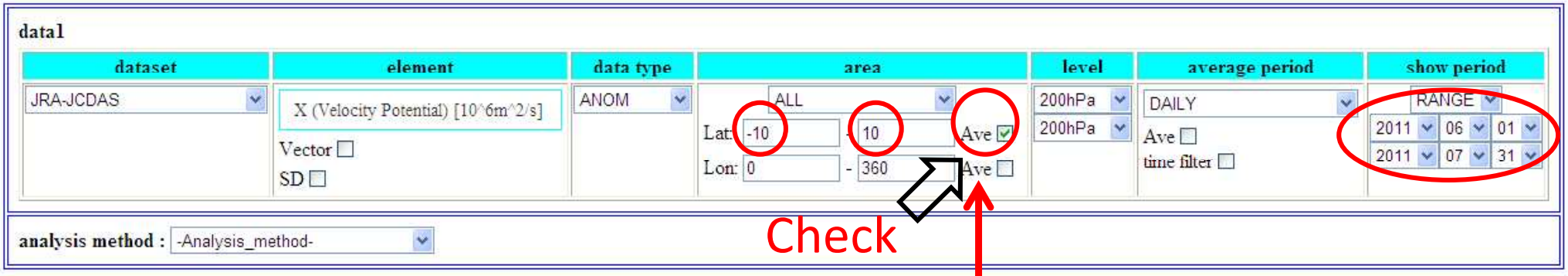
analysis method : -Analysis_method-

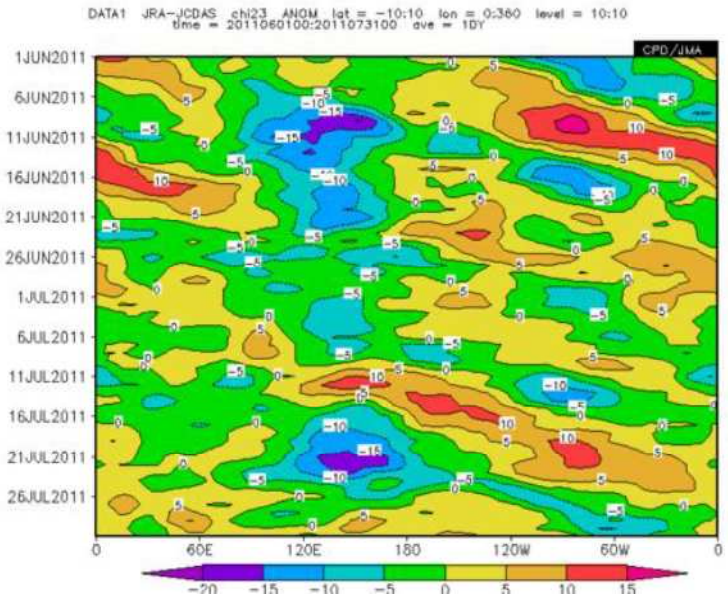


(data1)
Dataset: JRA-JCDAS
Element: X (Velocity Potential)
Data type: ANOM
Area: ALL
Level:
200hPa
200hPa
Average period: DAILY
Show period: 2011.06.01

First, please make a map of 200-hPa velocity potential anomaly on 1st June 2011 as mentioned above.

Time-longitude cross section of 200-hPa velocity potential





In the case of drawing a time-longitude cross section diagram, check "Ave" box of latitude(Lat) off.

(data1)
Lat: “-10” – “10”
Show period: 2011.06.01 – 2011.07.31

Secondly, input latitude and check “Ave” box off. And select “show period”.
Could you draw a map like sample?

Time-longitude cross section of 200-hPa velocity potential

Graphic Option

Colorizing : COLOR
Drawing : SHADE
Image Format : png
Font : default

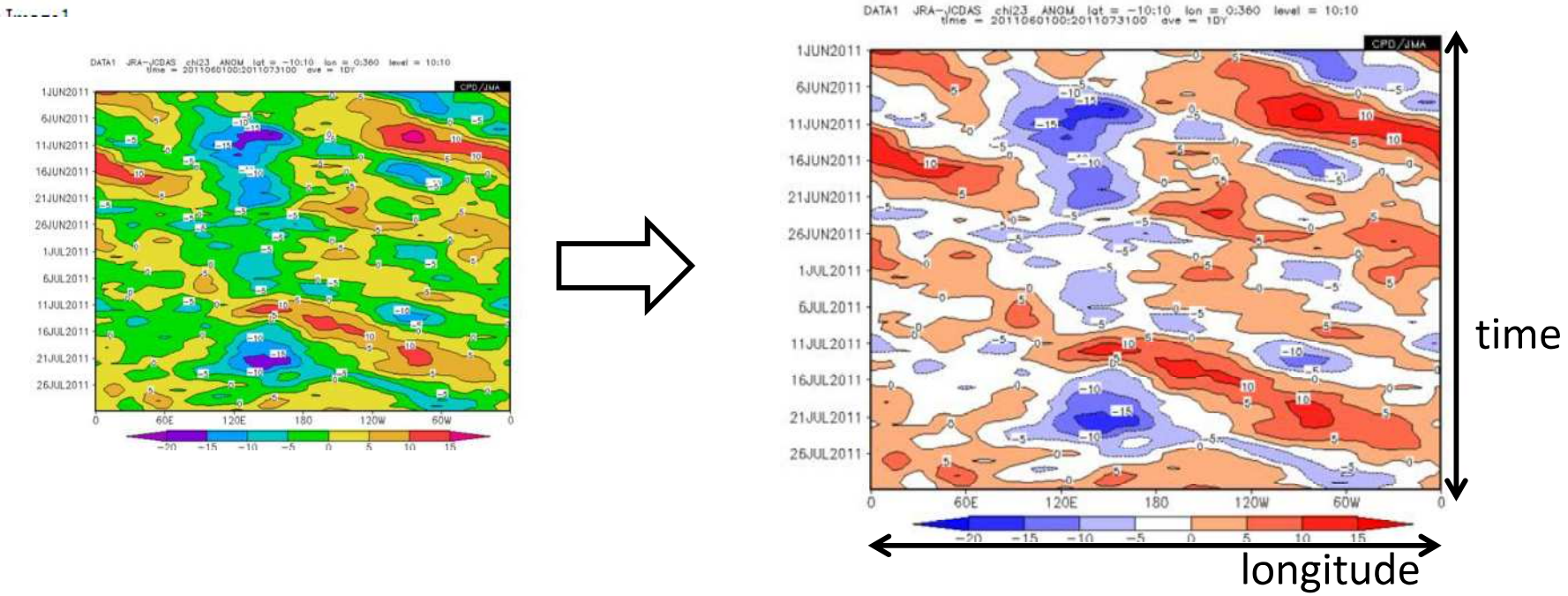
☑ Show Contour Labels
☑ Show Color Bar
☐ Set Contour Parameters for data1
interval : min : max :
☐ Set Vector size : [inch] value :

Color Table : Blue - Red
☐ Polar Stereographic : North pole
☐ Logarithmic Coordinates
☐ Reverse the Axes
☐ Flip the X-axis ☐ Flip the Y-axis
☐ No Caption

☐ No Scale Labels
☐ Draw Credit Inside
☐ Apply All Pics

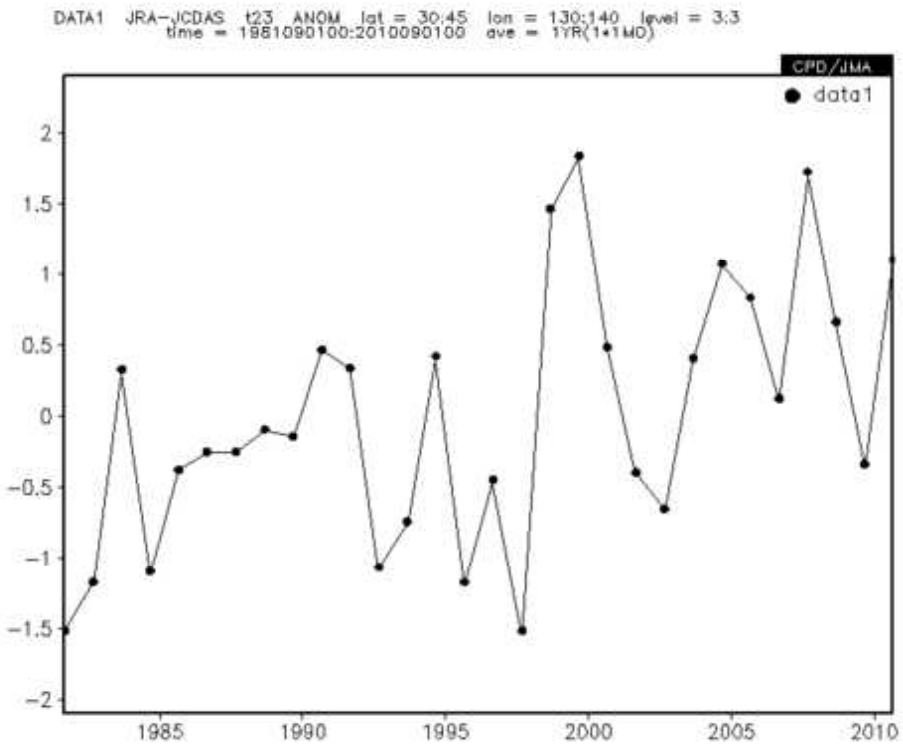
picture size 70 %

Submit | Clear | SliceTool | Help | Logout



Finally, let's select "Color Table" – "Blue - Red" and click "submit" button.

Interannual variation of monthly mean 850-hPa air temperature

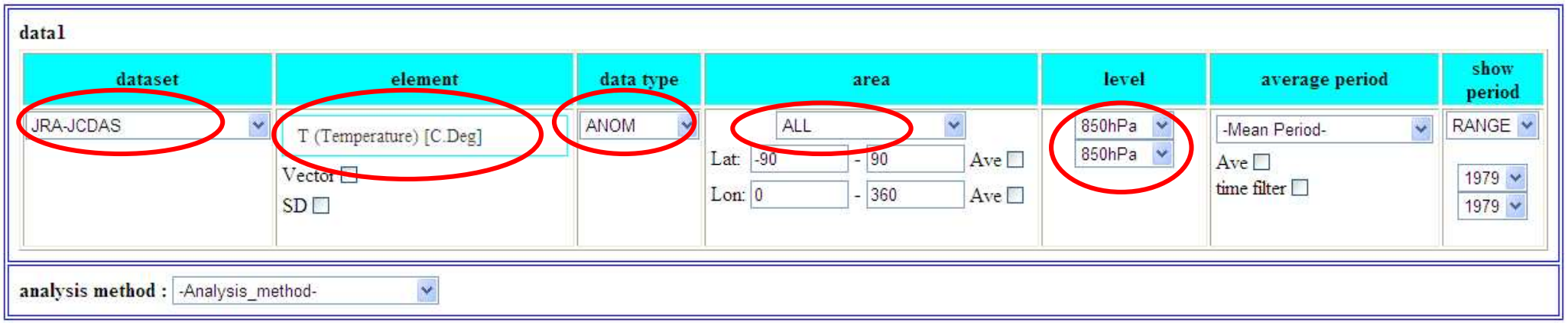


Interannual variation of monthly mean 850-hPa air temperature around Japan

Let’s try to draw line graph.

折れ線グラフを描画する方法を学びます。

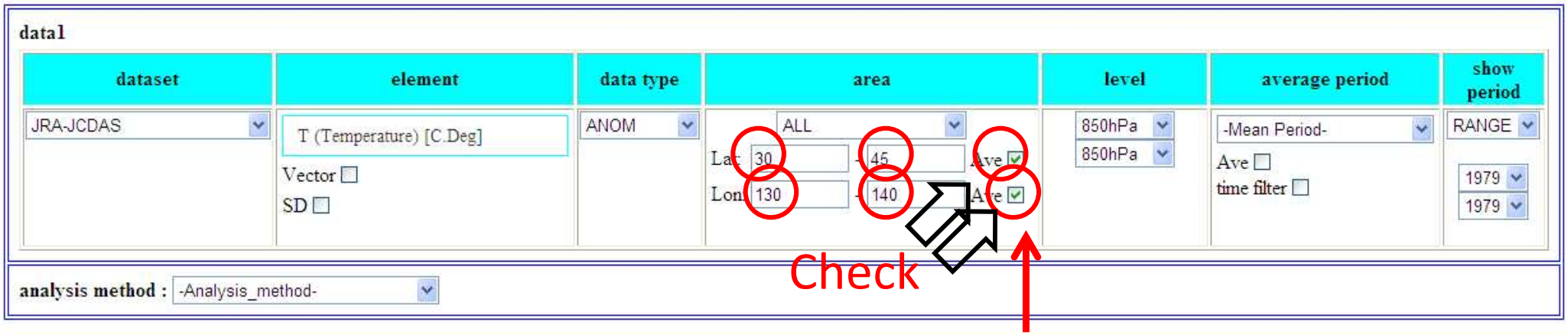
Interannual variation of monthly mean 850-hPa air temperature



Dataset: JRA-JCDAS
Element: T(Temperature)
Data type: ANOM(anomaly data)
Area: ALL
Level: 850hPa / 850hPa

First, please set parameters as mentioned above.

Interannual variation of monthly mean 850-hPa air temperature



Lat: “30”-”45” Ave: checked
Lon: “130”-”140” Ave: checked

Checking both “AVE” box off gives average data of area.

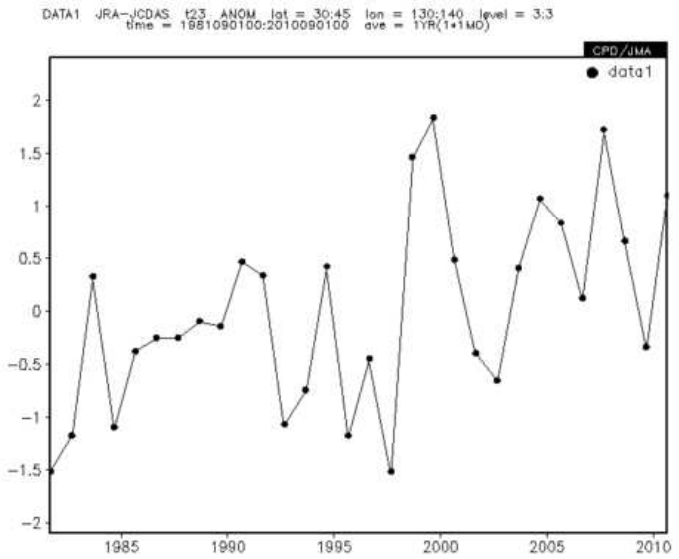
Secondly, input latitude and longitude. And check both “Ave” box off.

Interannual variation of monthly mean 850-hPa air temperature

data1

dataset	element	data type	area	level	average period	show period
JRA-JCDAS	T (Temperature) [C.Deg] Vector ☐ SD ☐	ANOM	ALL Lat: 30 - 45 Ave ☑ Lon: 130 - 140 Ave ☑	850hPa 850hPa	Year average Ave ☐ time filter ☐	RANGE 1981 - 2010 09 - 09

analysis method : -Analysis_method-

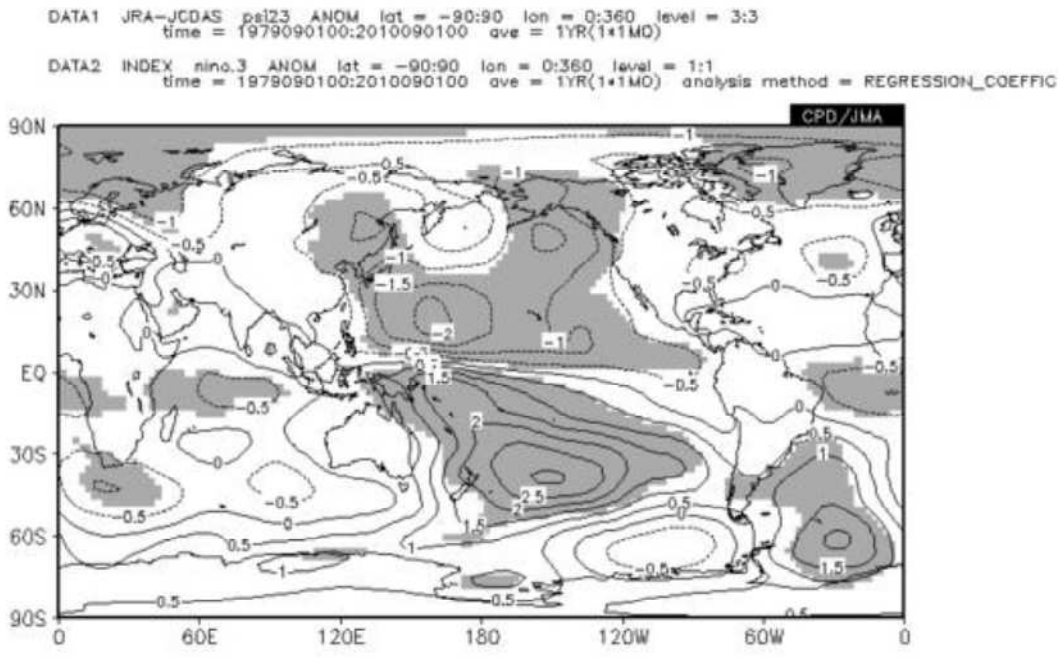


"Year average" means "Year average monthly".
This example gives us temperature in September between 1981 and 2010.

Average period: "Year average"
Show period:
"1981" – "2010"
"09" – "09"

Finally, select "average period" – "Year average" and "show period" as mentioned above. And let's click "Submit" button.

Regression Analysis : NINO.3 SST and 850hPa Stream Function



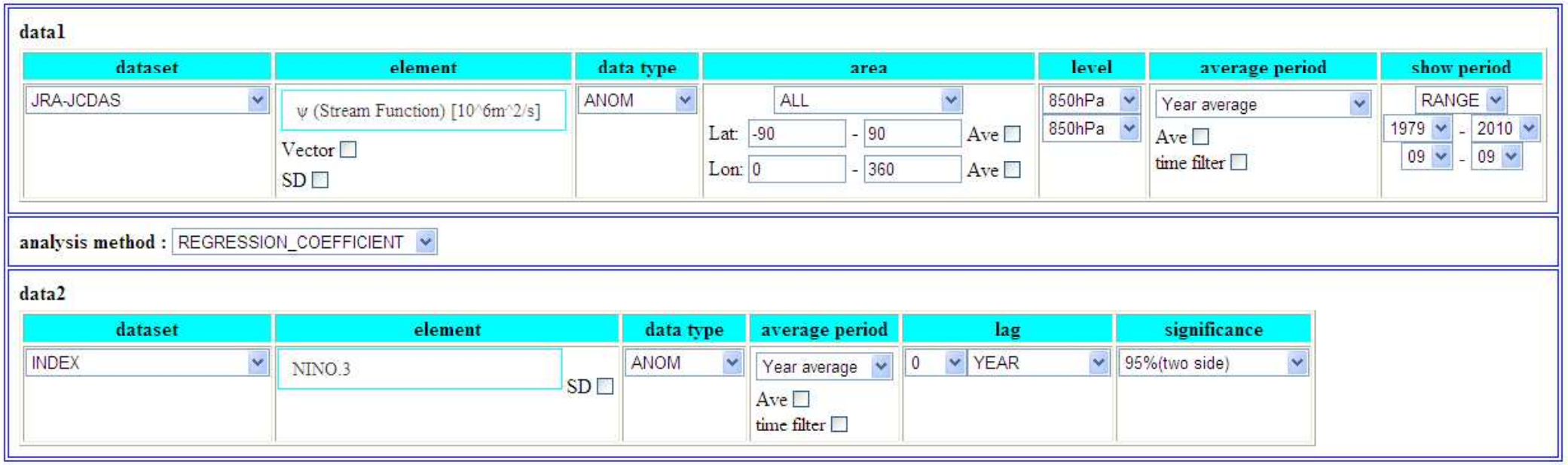
Regression Analysis : NINO.3 SST and 850hPa Stream Function

Let’s know regression analysis. In shaded area of a map, stream function has a close connection with SST of NINO.3.

*NINO.3: 5S-5N, 150-90W

NINO.3海域の海面水温と流線関数で回帰分析する方法を学びます。

Regression Analysis : NINO.3 SST and 850hPa Stream Function



(data1)
Dataset: JRA-JCDAS
Element: Ψ(Stream function)
Data type: ANOM(anomaly data)
Area: ALL
Level: 850hPa / 850hPa
average period: Year average
show period: 1979-2010 / 09-09

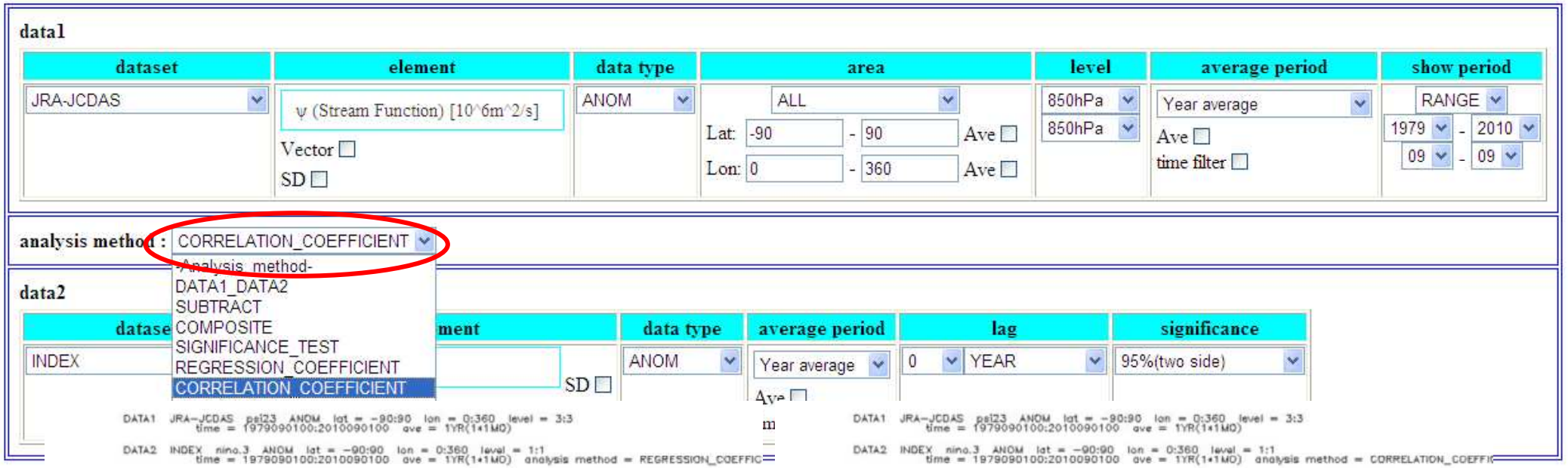
(analysis method)
REGRESSION_COEFFICIENT

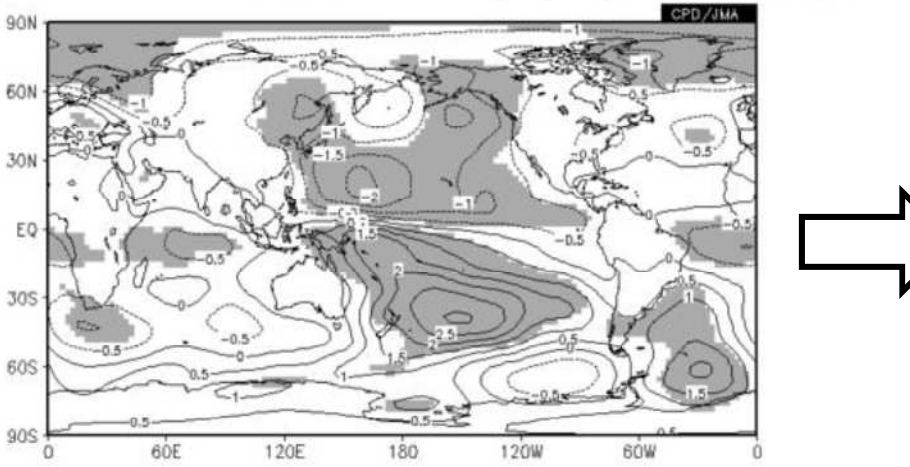
(data2)
Dataset: INDEX
Element: NINO.3
Data type: ANOM(anomaly data)
Significance: 95%

Let's try to set parameters as mentioned above and click submit button. A map like sample will be made.

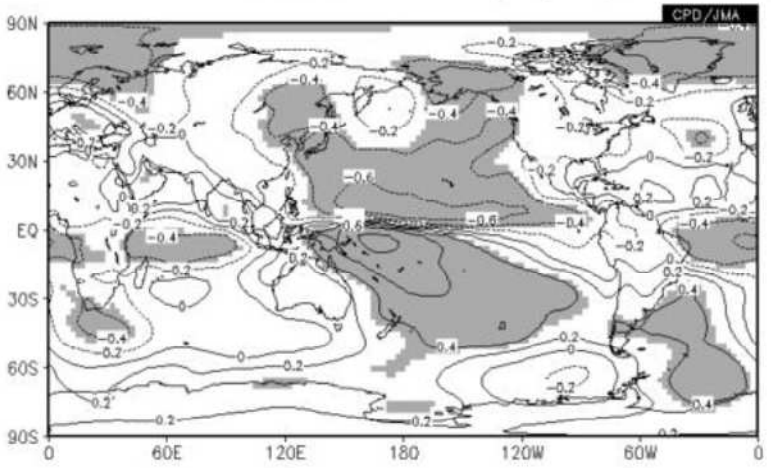
Hint: (Graphic option) Drawing: CONTOUR

Correlation Analysis





Regression Analysis



Correlation Analysis

Next, let's try correlation analysis.
Please change "analysis method" – "CORRELATION…" and click "submit" button.

Correlation and Regression

Correlation

- The strength of the linear relationship between two variables
- Correlation coefficient must be between -1 and 1

r < 0 : Negative correlation
r = 0 : No correlation
r > 0 : Positive correlation

Regression

- The slope of the linear relationship between two variables

Regression Coef.

$$y = a\,x + b + e$$

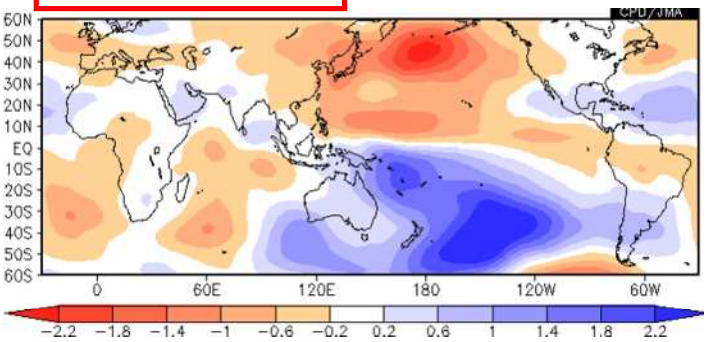
Residual

Intercept

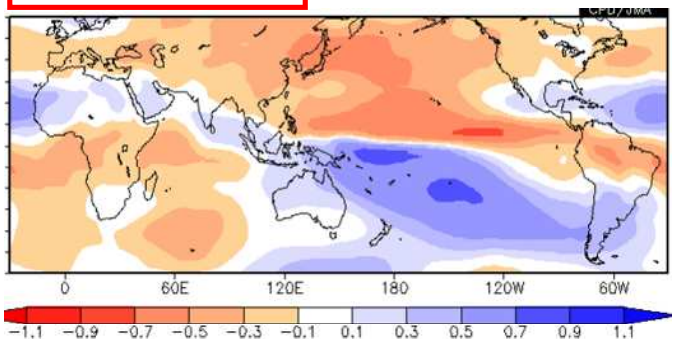
y: Fields to be regressed e.g. Stream function
x: Explanatory variable e.g. Nino3-SST

Relationship between Nino-3 SST and Stream function (850hPa)

Composite



Correlation



Regression