

**A Quick Tutorial
for
Statistical Analysis
by
the ITACS**

TCC/JMA Training Seminar on 19 January 2011
Climate Prediction Division of Japan Meteorological Agency

Contents

1

- **Introduction to the ITACS**

2

- **Basic Operations**

3

- **Regression Analysis**

4

- **How to use the data prepared by users**

The background of the slide is a light green gradient. Overlaid on this are several semi-transparent images: a globe of the Earth in the upper right, a blue network cable connector in the lower right, and a brown printed circuit board (PCB) with various traces in the lower left.

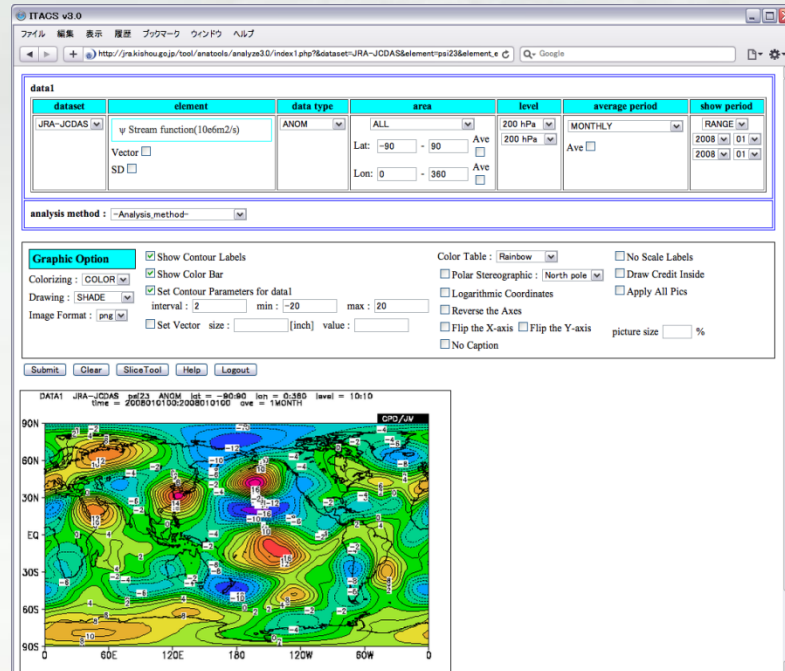
Chapter 1

Introduction to the ITACS

ITACS : Interactive Tool for Analysis of the Climate System

What is the ITACS?

- A web-based application software for climatological analysis



Features of the ITACS

Various climatological data-sets

- Atmospheric Analysis Data, Outgoing Longwave Radiation (by NOAA), SST, Ocean Analysis Data, etc.

Various types of charts

- Plain Longitude-Latitude Map, Polar Stereographic Map, Cross Section, Time Series Graph

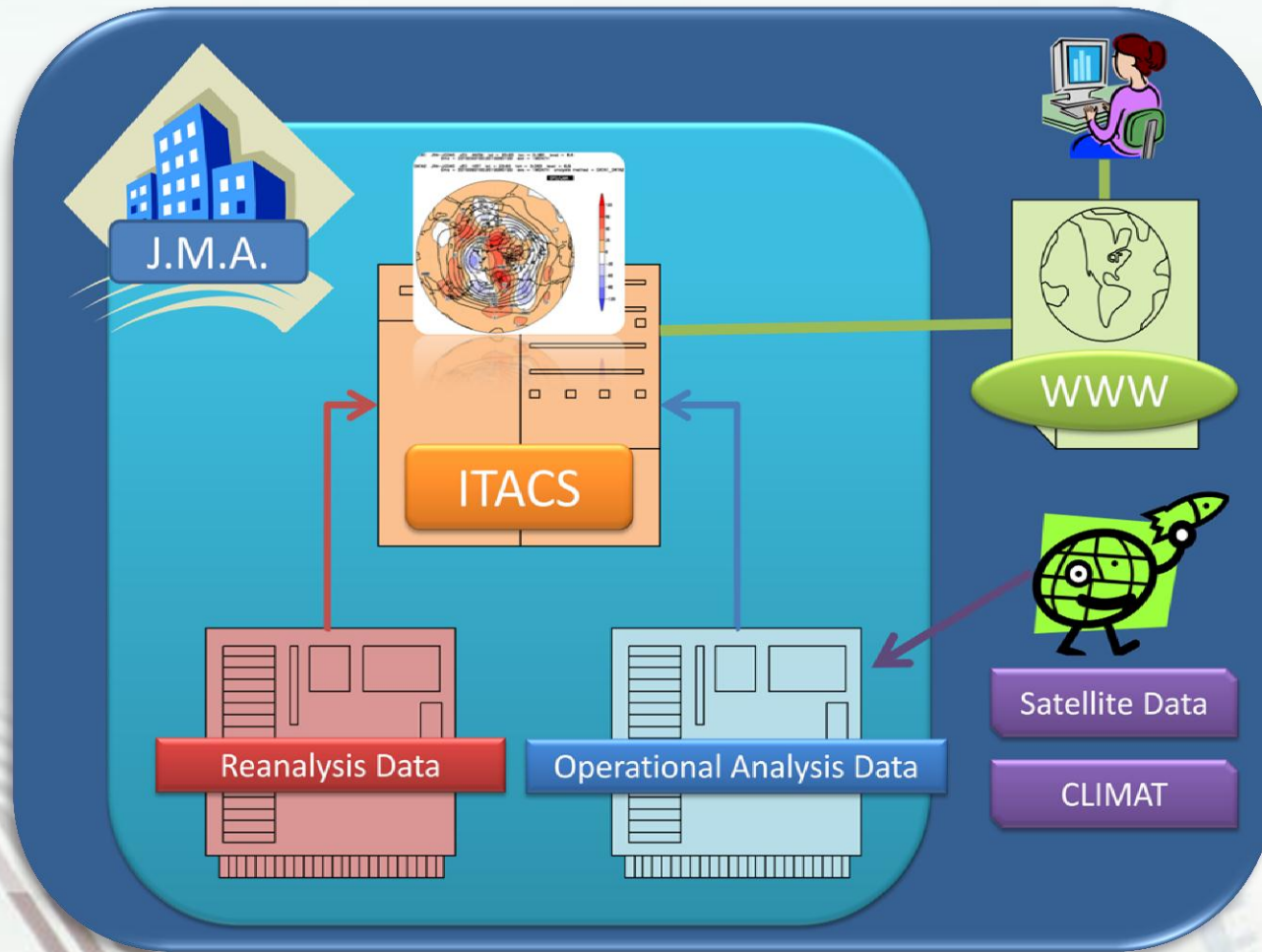
Various statistical functions

- Linear Regression, Correlation Coefficient, EOF, SVD, FFT, etc.

Requirement to use the ITACS

- Only A Web-Browser with Accessibility to the World Wide Web.

Conceptual Outline of the ITACS



The background of the slide features a light green gradient. On the right side, there is a faint, semi-transparent image of a globe. In the bottom left corner, there is a faint, semi-transparent image of a circuit board with various traces and components.

Chapter 2

Basic Operations

How to access to the ITACS

Start web browser and access following URL.

<http://jra.kishou.go.jp/itacs/analyze/index.php>



Input following ID and Password.

ID: tcc

Password: tcc



So, you will see main display of the ITACS!

Main Display of the ITACS

The screenshot shows the ITACS v3.0 web interface in a Mozilla Firefox browser window. The browser address bar shows the URL `http://jra.kishou.go.jp/itacs/analyze/index1.php`. The main content area is titled "data1" and contains a table for data configuration. Below the table is an "analysis method" selector. A "Graphic Option" section contains various checkboxes and dropdown menus for visualization settings. At the bottom, there are buttons for "Submit", "Clear", "SliceTool", "Help", "Help in JPN", and "Logout".

| dataset | element | data type | area | level | average period | show period |
|-----------|---------|-------------|--------|---------|----------------|---------------|
| -Dataset- | element | -Data_type- | -Area- | 1000hPa | 1000hPa | -Mean Period- |

analysis method : -Analysis_method-

Graphic Option

- Show Contour Labels
- Show Color Bar
- Set Contour Parameters for data1
 - interval : min : max :
 - Set Vector size : [inch] value :
- No Scale Labels
- Draw Credit Inside
- Apply All Pics
- Polar Stereographic : North pole
- Logarithmic Coordinates
- Reverse the Axes
- Flip the X-axis Flip the Y-axis
- No Caption
- picture size %

Buttons: Submit, Clear, SliceTool, Help, Help in JPN, Logout

Links: [Example Pictures](#), [Tutorial](#)

完了

Parameters for data setting

Geophysical parameters

Chronological parameters

Analysis method selector

Graphic Option Area

Submit button

Procedure for Setting Parameters

1

• **Select data-set, element, and data-type.**

2

• **Set geophysical parameters.**

3

• **Set chronological parameters.**

4

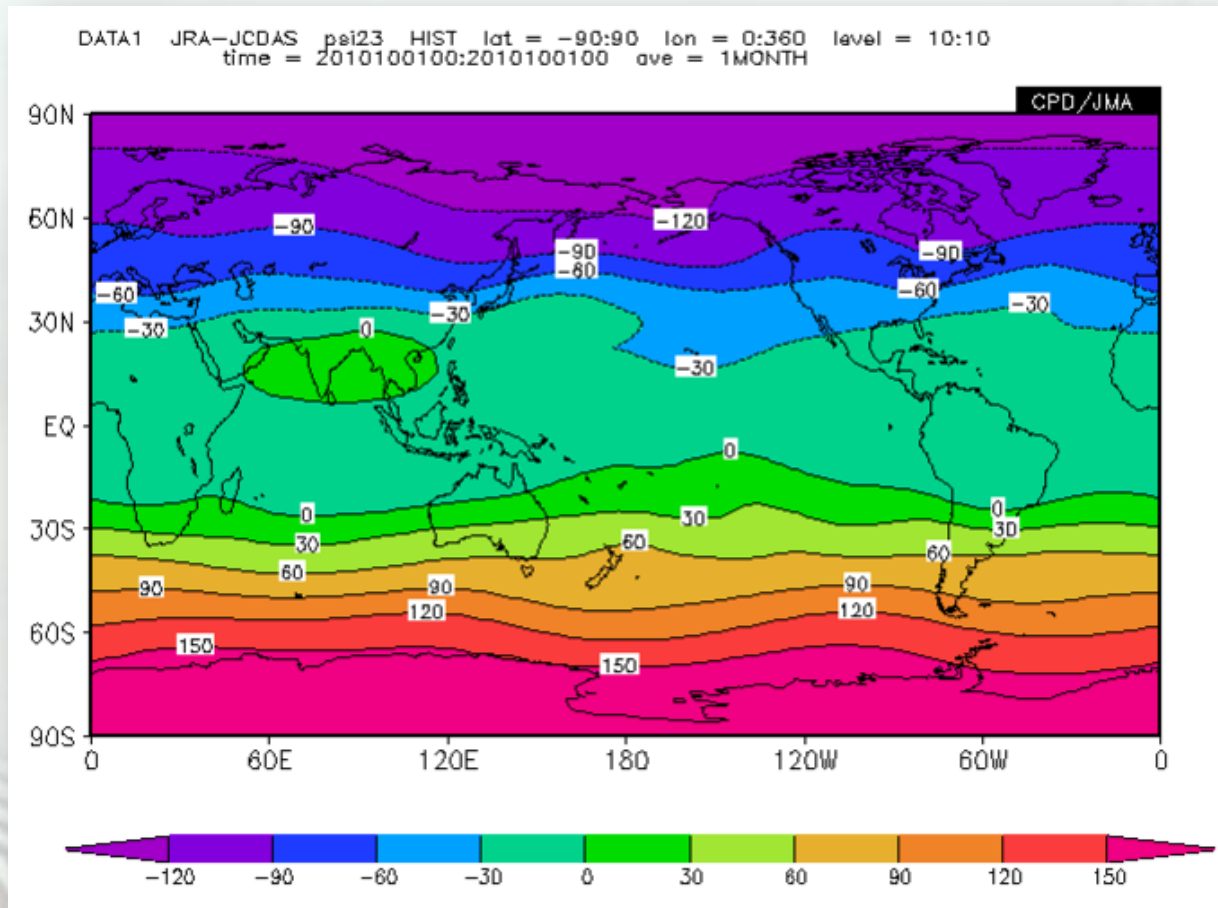
• **Select analysis method (in necessity).**

5

• **Set graphic parameters (in necessity).**

**Press
"Submit"**

Example1: 1-Element Map



200-hPa Stream Function on October 2010

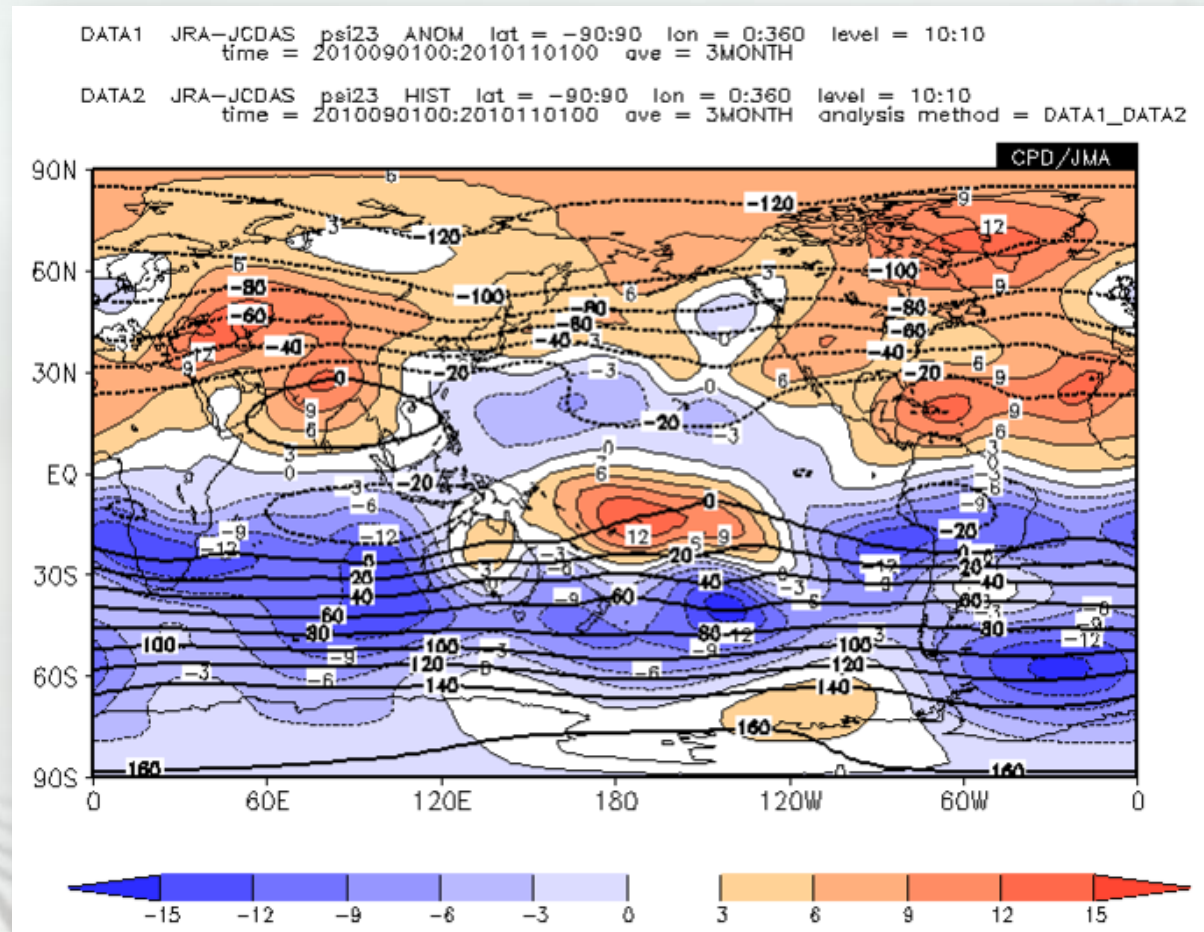
Parameter Setting

For data1

- dataset: JRA-JCDAS
- element: Pressure-levels – Stream function
- data type: HIST
 - “Hist” means historical observed or analysis data
 - “Anom” means anomaly
- area: ALL
 - latitude: -90 – 90, longitude: 0 – 360
- level: 200 hPa
- average period: MONTHLY
- show period: RANGE, 2010 10

| dataset | element | data type | area | level | average period | show period |
|-------------------------------------|---|-----------|--|-----------------|---|-----------------------------|
| JRA-JCDAS | ψ Stream function(10e6m ² /s) Vector <input type="checkbox"/> SD <input type="checkbox"/> | HIST | ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/> | 200 hPa 200 hPa | MONTHLY Ave <input type="checkbox"/> | RANGE 2010 10 2010 10 |
| analysis method : -Analysis_method- | | | | | | |

Example2: 2-Elements Map



3-month mean 200-hPa Stream Function and Anomaly
September – November 2010

Parameter Setting

For data1

- dataset: JRA-JCDAS, element: Pressure-levels – Stream function, data type: ANOM
- area: ALL, level: 200 hPa
- average period: MONTHLY (check “Ave” box)
- show period: RANGE, 2010 09 - 2010 11

analysis method

- DATA1_DATA2

For data2

- data type: HIST
- Other parameters are the same as for data1.

Graphic Option

- Set Contour Parameters for data1 – interval: 3 min: -15 max: 15
- Set Contour Parameters for data2 – interval: 20 min: -160 max: 160
- Color Table: Blue-Red

Parameter Setting (image)

data1

| dataset | element | data type | area | level | average period | show period |
|-----------|---|-----------|--|--------------------|--|-----------------------------|
| JRA-JCDAS | ψ Stream function(10e6m ² /s) Vector <input type="checkbox"/> SD <input type="checkbox"/> | ANOM | ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/> | 200 hPa 200 hPa | MONTHLY Ave <input checked="" type="checkbox"/> | RANGE 2010 09 2010 11 |

analysis method : DATA1_DATA2

data2

| dataset | element | data type | area | level | average period | show period |
|-----------|--|-----------|--|--------------------|--|-----------------------------|
| JRA-JCDAS | ψ Stream function(10e6m ² /s) SD <input type="checkbox"/> | HIST | ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/> | 200 hPa 200 hPa | MONTHLY Ave <input checked="" type="checkbox"/> | RANGE 2010 09 2010 11 |

Graphic Option

Colorizing : COLOR
Drawing : SHADE
Image Format : png

Show Contour Labels
 Show Color Bar
 Set Contour Parameters for data1
 interval : 3 min : -15 max : 15
 Set Contour Parameters for data2
 interval : 20 min : -160 max : 160
 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 [] %

The background of the slide features a light green and blue gradient. On the right side, there is a faint, semi-transparent image of a globe. In the bottom left corner, there is a faint, semi-transparent image of a circuit board with various traces and components.

Chapter 3

Regression Analysis

How to perform Regression Analysis

Select "REGRESSION COEFFICIENT" in "analysis method"

| data1 | | | | | | |
|-----------|--|-----------|--|---------|------------------------------|------------------------|
| dataset | element | data type | area | level | average period | show period |
| JRA-JCDAS | ψ Stream function(10 ⁶ m ² /s) | ANOM | ALL | 850 hPa | Year average | RANGE |
| | Vector <input type="checkbox"/> SD <input type="checkbox"/> | | Lat: -60 - 60 Ave <input type="checkbox"/> Lon: 0 - 360 | 850 hPa | Ave <input type="checkbox"/> | 1979 - 2010 09 - 09 |

analysis method : REGRESSION_COEFFICIENT

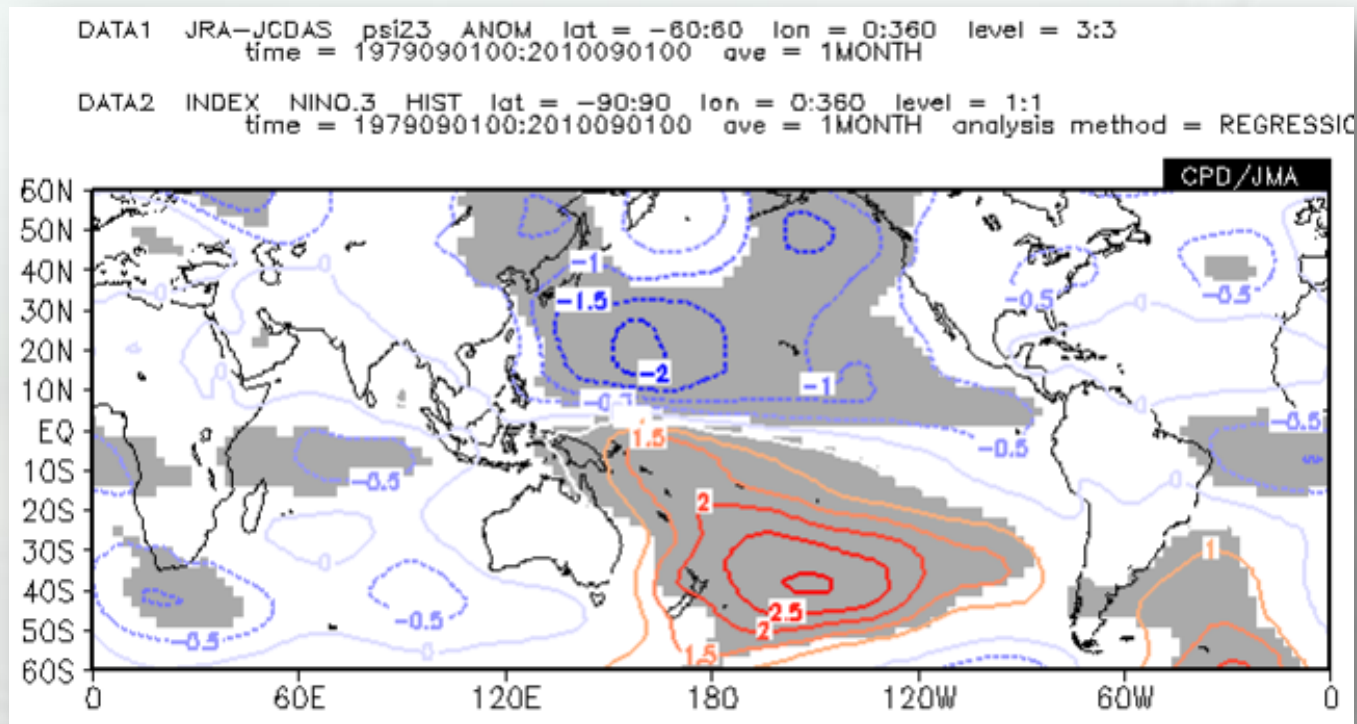
| data2 | | | | | | |
|---------|-----------------------------|-----------|------------------------------|--------|---------------|--|
| dataset | element | data type | average period | lag | significance | |
| INDEX | NINO.3 | HIST | Year average | 0 YEAR | 95%(two side) | |
| | SD <input type="checkbox"/> | | Ave <input type="checkbox"/> | | | |

Independent Variable: data2
Dependent Variable: data1

Time Lag between data1 and data2

Confidence Level based on T-test

An Example of Regression Analysis



Regression Coefficient between SST for NINO.3 and 850hPa Stream Function

- **Gray shaded areas are statistically significance with 5% significance level**

Parameter Setting

For data1 (dependent variable)

- dataset: JRA-JCDAS, element: Stream-function, data type: ANOM
- Lat: -60 – 60, Lon: 0 – 360, level: 850hPa
- average period: Year average, show period: RANGE, 1979/09 – 2010/09

For analysis method

- REGRESSION COEFFICIENT

For data2 (independent variable)

- dataset: INDEX, element: NINO3, data type: HIST
- Significance: 95%(two side)

For graphic option

- Coloring: COLOR, Drawing: CONTOUR, Color Table: Blue-Red

What means “Year Average”?

| average period | show period |
|---|---|
| Year average <input type="button" value="v"/> | RANGE <input type="button" value="v"/> |
| Ave <input type="checkbox"/> | 1979 <input type="button" value="v"/> - 2010 <input type="button" value="v"/> |
| | 09 <input type="button" value="v"/> - 09 <input type="button" value="v"/> |

Year Month
1979 01
1979 02
1979 03
1979 04
1979 05
1979 06
1979 07
1979 08
1979 09
1979 10
1979 11
1979 12
1980 01
1980 02
1980 03
1980 04
1980 05
1980 06
1980 07
1980 08
1980 09
1980 10
1980 11
1980 12

.....
2010 01
2010 02
2010 03
2010 04
2010 05
2010 06
2010 07
2010 08
2010 09
2010 10
2010 11
2010 12



Sampling data in the same month from consecutive years

Parameter Setting (image)

data1

| dataset | element | data type | area | level | average period | show period |
|-----------|---|-----------|--|--------------------|--|---------------------------------|
| JRA-JCDAS | ψ Stream function(10e6m ² /s) | ANOM | ALL Lat: -60 - 60 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/> | 850 hPa 850 hPa | Year average Ave <input type="checkbox"/> | RANGE 1979 - 2010 09 - 09 |

analysis method : REGRESSION_COEFFICIENT

data2

| dataset | element | data type | average period | lag | significance |
|---------|---------|-----------|--|--------|---------------|
| INDEX | NINO.3 | HIST | Year average Ave <input type="checkbox"/> | 0 YEAR | 95%(two side) |

Graphic Option

Show Contour Labels
 Show Color Bar
 Set Contour Parameters for data1
 interval : min : max :
 Set Vector size : [inch] value :
 No Scale Labels
 Draw Credit Inside
 Apply All Pics
 No Caption
 picture size %

Colorizing : COLOR
 Drawing : CONTOUR
 Image Format : png

Color Table : Blue - Red
 Polar Stereographic : North pole
 Logarithmic Coordinates
 Reverse the Axes
 Flip the X-axis Flip the Y-axis

Chapter4

How to use the data prepared by users on the ITACS

Requirements on User Input Data

A Text File in CSV format

One Directional Time Series

Single Station (Point) Data

The Order of Fields in a Record ↓

- **<year>, <month>, <day>, <data value>**

How to input the User Data

- 1 • Select “USER INPUT” for “dataset”
- 2 • Select “UPLOAD TXT” in “element”.
- 3 • Press “Browse...” button in “input txt”
- 4 • select the data file and press “upload” button.

| dataset | element | input txt |
|------------|------------|-----------|
| USER INPUT | element | |
| | UPLOAD TXT | |
| | INPUT DATA | |

analysis method : -Analysis_method-

input txt

Browse... upload

Choose File to Upload

Libraries > Documents > business

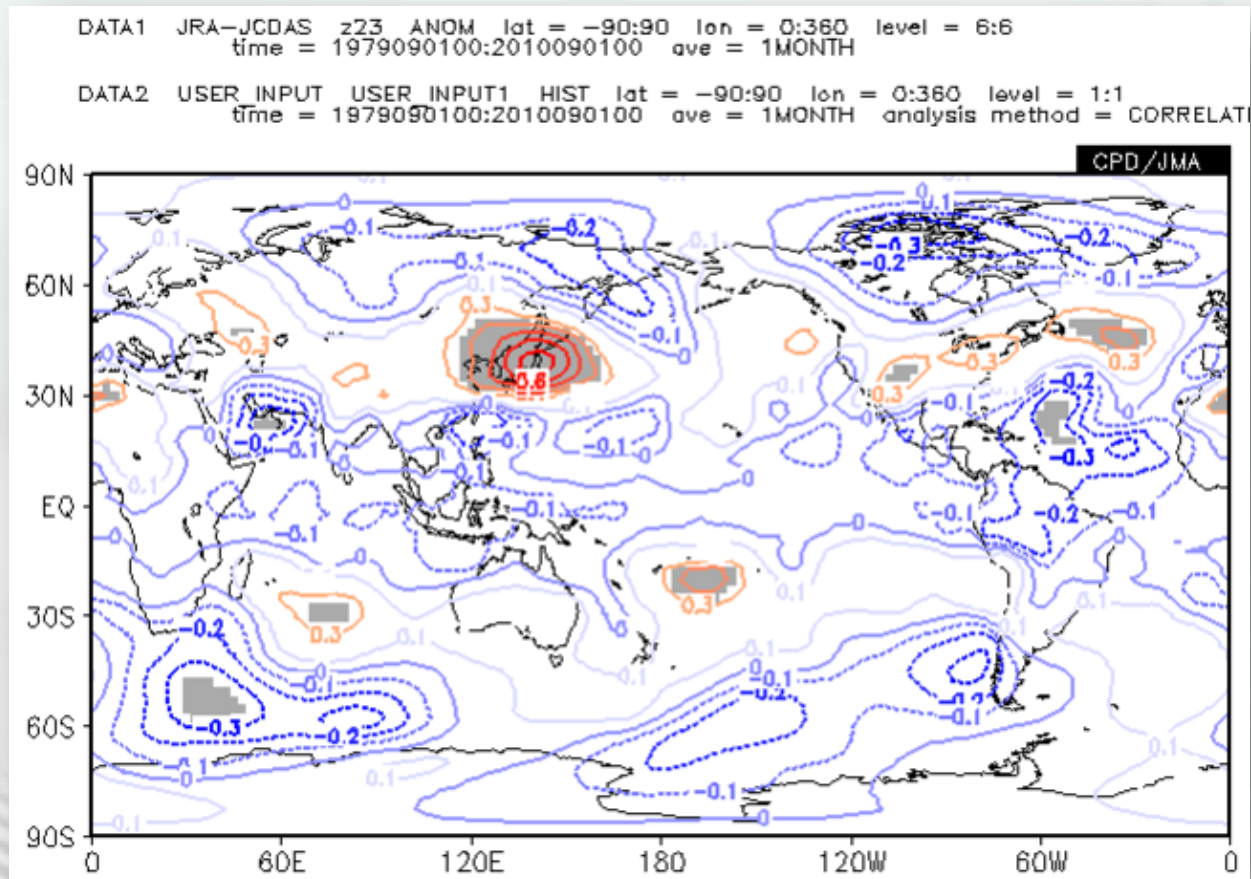
Documents library

File name: tokyo.bt

All Files (*.*)

Open Cancel

An Example for User Input Data



Correlation Coefficient between Temperature of Tokyo
and 500-hPa Geopotential Height

Parameter Setting

For data1 (dependent variable)

- dataset: JRA-JCDAS, element: Geopotential height, data type: ANOM
- area: ALL, level: 500hPa
- average period: Year average, show period: RANGE, 1979/09 – 2010/09

For analysis method

- CORRELATION COEFFICIENT

For data2 (independent variable)

- dataset: USER INPUT
- element: UPLOAD_TEXT (upload tokyo_temp.txt in this exercise)
- Significance: 95%

For graphic option

- Coloring: COLOR, Drawing: CONTOUR, Color Table: Blue-Red

Parameter Setting (image)

data1

| dataset | element | data type | area | level | average period | show period |
|-----------|--|-----------|--|--------------------|--|---------------------------------|
| JRA-JCDAS | γ Geopotential height(gpm) Vector <input type="checkbox"/> SD <input type="checkbox"/> | ANOM | ALL Lat: -90 - 90 Ave <input type="checkbox"/> Lon: 0 - 360 Ave <input type="checkbox"/> | 500 hPa 500 hPa | Year average Ave <input type="checkbox"/> | RANGE 1979 - 2010 09 - 09 |

analysis method : CORRELATION_COEFFICIENT

data2

| dataset | element | input txt | average period | lag | significance |
|------------|---|--------------|--|--------|---------------|
| USER INPUT | UPLOAD TXT SD <input type="checkbox"/> | 参照... upload | Year average Ave <input type="checkbox"/> | 0 YEAR | 95%(two side) |

Graphic Option

| | | |
|--|--|---|
| <input checked="" type="checkbox"/> Show Contour Labels <input checked="" type="checkbox"/> Show Color Bar <input type="checkbox"/> Set Contour Parameters for data1 interval : <input type="text"/> min : <input type="text"/> max : <input type="text"/> <input type="checkbox"/> Set Vector size : <input type="text"/> [inch] value : <input type="text"/> | Color Table : Blue - Red <input type="checkbox"/> Polar Stereographic : North pole <input type="checkbox"/> Logarithmic Coordinates <input type="checkbox"/> Reverse the Axes <input type="checkbox"/> Flip the X-axis <input type="checkbox"/> Flip the Y-axis <input type="checkbox"/> No Caption | <input type="checkbox"/> No Scale Labels <input type="checkbox"/> Draw Credit Inside <input type="checkbox"/> Apply All Pics picture size <input type="text"/> % |
|--|--|---|

The background features a light green gradient with a faint, semi-transparent image of a globe and circuit board traces. The globe is positioned on the right side, and the circuit traces are visible in the bottom left corner.

Appendix

I. A Sample for User Input Data

```
#Monthly mean temperature of Tokyo↓  
#undef=9999↓  
#element=Temperature↓  
#year, month, day, temp. ↓  
1979, 1, 1, 6. 6↓  
1979, 2, 1, 8. 4↓  
1979, 3, 1, 9. 9↓  
1979, 4, 1, 13. 9↓  
1979, 5, 1, 18. 6↓  
1979, 6, 1, 24. 4↓  
1979, 7, 1, 25. 2↓  
1979, 8, 1, 27. 4↓  
.....  
2010, 8, 1, 29. 6↓  
2010, 9, 1, 25. 1↓
```

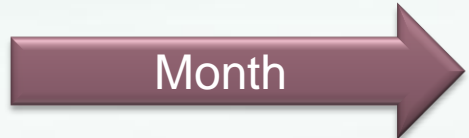
A comment line

The Definition of Undefined Value

Denoting Element Name

Every Line must be terminated with a Newline Code

Typical Examples of Unsuitable Format



Year, Jan., Feb., Mar., Apr., May, Jun., Jul., Aug., Sep., Oct., Nov., Dec.
 1979, 6.6, 8.4, 9.9, 13.9, 18.6, 24.4, 25.2, 27.4, 24.1, 19.6, 14.3, 10.1
 1980, 5.6, 5.2, 8.2, 13.6, 19.2, 23.6, 23.8, 23.4, 23.0, 18.2, 13.0, 7.7
 1981, 4.4, 5.3, 9.0, 13.9, 17.5, 20.2, 26.3, 26.2, 21.8, 17.6, 10.4, 7.6
 1982, 5.8, 5.5, 9.9, 14.0, 20.7, 21.4, 23.1, 27.1, 22.3, 18.0, 14.3, 9.5
 1983, 6.2, 6.1, 8.6, 15.9, 19.7, 20.5, 23.8, 27.5, 23.1, 17.7, 12.3, 7.1
 1984, 3.7, 3.0, 5.9, 11.6, 17.2, 21.8, 26.2, 28.6, 23.5, 17.7, 12.2, 7.7
 1985, 4.1, 6.5, 7.8, 14.2, 19.1, 20.2, 26.3, 27.9, 23.1, 17.9, 13.3, 7.4
 1986, 4.5, 4.3, 7.8, 13.9, 17.9, 21.1, 23.9, 26.8, 23.7, 17.1, 12.3, 8.5
 1987, 5.8, 6.8, 9.3, 14.4, 19.3, 22.1, 27.0, 27.3, 23.3, 18.9, 12.8, 8.1
 1988, 7.7, 4.9, 8.4, 14.3, 18.2, 22.3, 22.4, 27.0, 22.8, 17.5, 11.4, 8.4
 1989, 8.1, 7.5, 9.6, 15.6, 17.7, 20.7, 24.1, 27.1, 25.2, 17.5, 14.2, 9.2
 1990, 5.0, 7.8, 10.6, 14.7, 19.2, 23.5, 25.7, 28.6, 24.8, 19.2, 15.1, 10.0
 1991, 6.3, 6.5, 9.5, 15.4, 18.8, 23.6, 26.7, 25.5, 23.9, 18.1, 13.0, 9.2
 1992, 6.8, 6.9, 9.7, 15.1, 17.3, 20.6, 25.5, 27.0, 23.3, 17.3, 13.0, 9.4
 1993, 6.2, 7.7, 8.7, 13.4, 18.1, 21.7, 22.5, 24.8, 22.9, 17.5, 14.1, 8.5
 1994, 5.5, 6.6, 8.1, 15.8, 19.5, 22.4, 28.3, 28.9, 24.8, 20.2, 13.4, 9.0
 1995, 6.3, 6.5, 8.9, 15.0, 19.1, 20.4, 26.4, 29.4, 23.7, 19.5, 12.7, 7.7
 1996, 6.6, 5.4, 9.2, 12.7, 18.1, 22.6, 26.2, 26.0, 22.4, 18.0, 13.2, 9.3
 1997, 6.8, 7.0, 10.5, 15.2, 19.2, 22.7, 26.6, 27.0, 22.9, 18.7, 14.3, 9.2
 1998, 5.3, 7.0, 10.1, 16.3, 20.5, 21.5, 25.3, 27.2, 24.4, 20.1, 13.9, 9.0
 1999, 6.6, 6.7, 10.1, 15.0, 19.9, 22.8, 25.9, 28.5, 26.2, 19.5, 14.2, 9.0
 2000, 7.6, 6.0, 9.4, 14.5, 19.8, 22.5, 27.7, 28.3, 25.6, 18.8, 13.3, 8.8
 2001, 4.9, 6.6, 9.8, 15.7, 19.5, 23.1, 28.5, 26.4, 23.2, 18.7, 13.1, 8.4
 2002, 7.4, 7.9, 12.2, 16.1, 18.4, 21.6, 28.0, 28.0, 23.1, 19.0, 11.6, 7.2
 2003, 5.5, 6.4, 8.7, 15.1, 18.8, 23.2, 22.8, 26.0, 24.2, 17.8, 14.4, 9.2
 2004, 6.3, 8.5, 9.8, 16.4, 19.6, 23.7, 28.5, 27.2, 25.1, 17.5, 15.6, 9.9
 2005, 6.1, 6.2, 9.0, 15.1, 17.7, 23.2, 25.6, 28.1, 24.7, 19.2, 13.3, 6.4
 2006, 5.1, 6.7, 9.8, 13.6, 19.0, 22.5, 25.6, 27.5, 23.5, 19.5, 14.4, 9.5
 2007, 7.6, 8.6, 10.8, 13.7, 19.8, 23.2, 24.4, 29.0, 25.2, 19.0, 13.3, 9.0
 2008, 5.9, 5.5, 10.7, 14.7, 18.5, 21.3, 27.0, 26.8, 24.4, 19.4, 13.1, 9.8
 2009, 6.8, 7.8, 10.0, 15.7, 20.1, 22.5, 26.3, 26.6, 23.0, 19.0, 13.5, 9.0
 2010, 7.0, 6.5, 9.1, 12.4, 19.0, 23.6, 28.0, 29.6, 25.1, 18.9, 13.5, 9.9

#year, month, day, Gifu, Nagoya, Tsu, Shizuoka
 1979, 1, 1, 5.7, 5.6, 5.7, 7.3
 1979, 2, 1, 7.4, 7.2, 7.2, 9.4
 1979, 3, 1, 8.5, 8.2, 7.6, 10.2
 1979, 4, 1, 13.2, 13, 12.5, 14.5
 1979, 5, 1, 18.4, 18.1, 17.7, 17.9
 1979, 6, 1, 24.1, 23.6, 22.9, 23.7
 1979, 7, 1, 25.8, 25.2, 24.9, 24.8
 1979, 8, 1, 27.9, 27.4, 27, 27
 1979, 9, 1, 23.9, 23.8, 23.2, 24.3
 1979, 10, 1, 18.8, 18.5, 18.2, 19.6
 1979, 11, 1, 12.7, 12.6, 12.6, 14.9
 1979, 12, 1, 8.2, 7.9, 8, 10.1
 1980, 1, 1, 4.2, 4.1, 4.4, 6.5
 1980, 2, 1, 3.5, 3.4, 3.9, 5.7
 1980, 3, 1, 8.1, 7.9, 7.4, 9.7
 1980, 4, 1, 13.2, 12.9, 12.4, 14.3
 1980, 5, 1, 18.6, 18.4, 17.7, 18.7
 1980, 6, 1, 23.4, 23.1, 22.8, 22.9
 1980, 7, 1, 25, 24.8, 24.3, 24.8
 1980, 8, 1, 25.3, 25.1, 24.7, 24.9
 1980, 9, 1, 22.8, 22.5, 21.9, 23
 1980, 10, 1, 17.5, 17.2, 17.2, 18.6
 1980, 11, 1, 12.5, 12.1, 12, 14.2
 1980, 12, 1, 5.1, 5.1, 5.7, 7.3

2-Directional Time Series

Multiple Station Data

II: A Passage to ITACS

Application to the ITACS

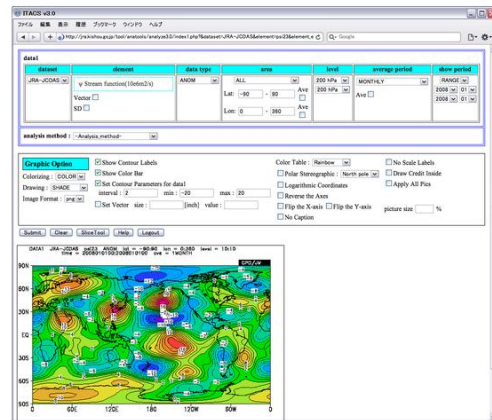
- <http://jra.kishou.go.jp/itacs-info/tcc/itacsinfo.html>

ITACS : Interactive Tool for Analysis of the Climate System

The **ITACS** is a web-based application for climatological analysis.

The Japan Meteorological Agency (JMA) has developed the ITACS to assist National Meteorological and Hydrological Services (NMHSs) in analyzing the causes of extreme climate events. The ITACS will enable users not only to monitor current climate conditions but also to analyze the characteristics and factors that lie behind such conditions and extreme climatic events. Those who are, basically at NMHSs, interested in using the ITACS are required to submit application to JMA in order to receive permission to use (Application for using the ITACS page).

For using the ITACS, users are required only to access the internet through major web browsers, but not necessary to set up any programs and download any data sets.



The Display of the ITACS

Application for using the ITACS

Please read the *Conditions of Use* outlined below before applying to JMA to use the *Interactive Tool for Analysis of the Climate System* (ITACS). The Japan Meteorological Agency (JMA) will examine applications and, if the application is accepted, issue ID and password.

JMA permits persons at National Meteorological and Hydrological Services to use the ITACS.

Conditions of Use

1. Users should provide user information including name, affiliation, e-mail address and purpose of data use.
2. The use of figures and/or data produced by ITACS for commercial purposes is prohibited.
3. Users should not let any third party use the ID/password information issued, and should keep this information private at all times.
4. The use of ITACS should be duly acknowledged in scientific or technical papers, publications, press releases or other communications.

Sample of citation:

- The figures and statistical analysis in this study were made using ITACS data provided by the Japan Meteorological Agency.
5. The data source used in ITACS should be checked, and acknowledged if necessary, in scientific or technical papers, publications, press releases or other communications.
 6. Users should provide JMA with a copy of their scientific or technical papers, publications, press releases or other communications involving ITACS.

III: More Intimate Tutorial for the ITACS

Please access following URL.

- <http://jra.kishou.go.jp/itacs/ana3.0/Tutorial.pdf>
 - **Notice: Required A Formal ITACS Account**

ITACS ver.3.0 Tutorial

The screenshot displays the ITACS configuration interface. It is divided into several sections:

- data1:** A table with columns 'element' and 'data type'. The 'element' is 'JRA-K243' and the 'data type' is 'ARCM'. There are checkboxes for 'Vector' and 'SU'.
- analysis method:** A dropdown menu set to 'Zonal_ave'.
- area:** A section with 'ALL' selected in a dropdown. Below it are input fields for 'Lat' (0 to 60) and 'Lon' (110 to 150), each with an 'Ave' checkbox. To the right, there are 'level' dropdowns set to '1000 hPa' and '70 hPa'.
- average period / show period:** A section with 'MONTHLY' selected in a dropdown. Below it are 'RANGE' and 'Ave' checkboxes, and two date pickers for '2006 07'.
- Visualization:** A small plot at the bottom showing a latitude-height cross-section with color-coded data.

5. Proper way to fix dimensions

In ITACS we treat four-dimensional data but we can draw one or two-dimensional data in ITACS. In other words, we must fix the other dimensions. Now we try to draw latitude-height cross section chart to understand the proper way to fix dimensions. Please select as below.

Analysis Method / -Analysis method:
Dataset / JRA-K243
Element / Pressure levels Pressure vertical velocity
Data Type / ANOM

Here, we will average pressure vertical velocity from 110–150° E and show them on latitude-height cross section (0–60° N, 1000–70hPa). So please select and customize as below.

Area / all Lat 0-60 "Ave" unchecked
Lon 110-150 "Ave" checked
Level / upper: 1000hPa lower: 70hPa

When "Ave" for "Lon" checked, data are averaged from specified longitude range so longitude dimension is fixed. And when different levels are chosen from each menu in "Level", vertical dimension are set to vary. In this case, among three spatial dimensions, two dimensions (latitude dimension and vertical dimension) are set to vary (longitude dimension is fixed.). So if we set time dimension we can show latitude-height cross section. Please select as below and click "Submit".

average period / MONTHLY
show period / upper: RANGE middle and lower: 2006 07