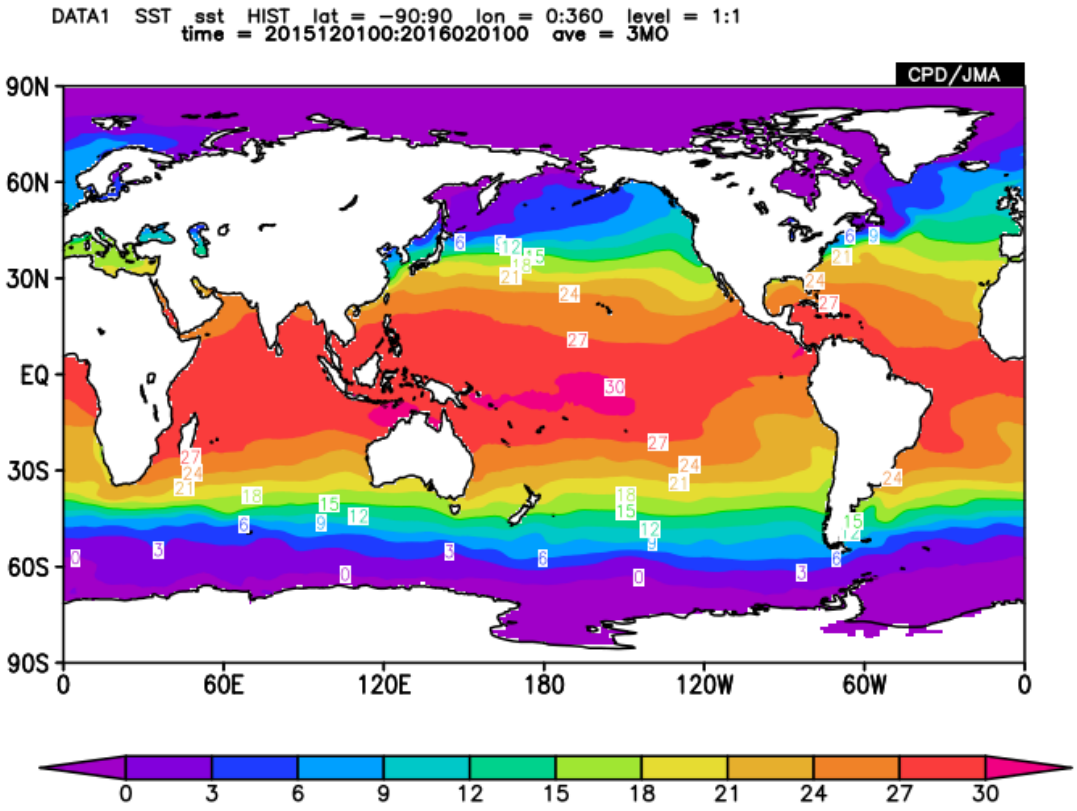
iTacs Drill

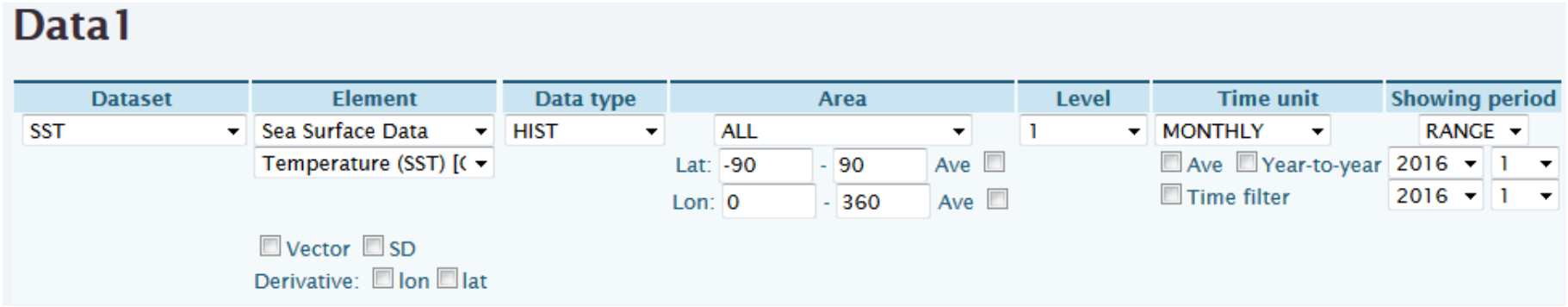
Q1-1: X-Y map –time average(1)–

Make a monthly mean SST map for January 2016.

Variable: SST (hist)
Period: Janary 2016



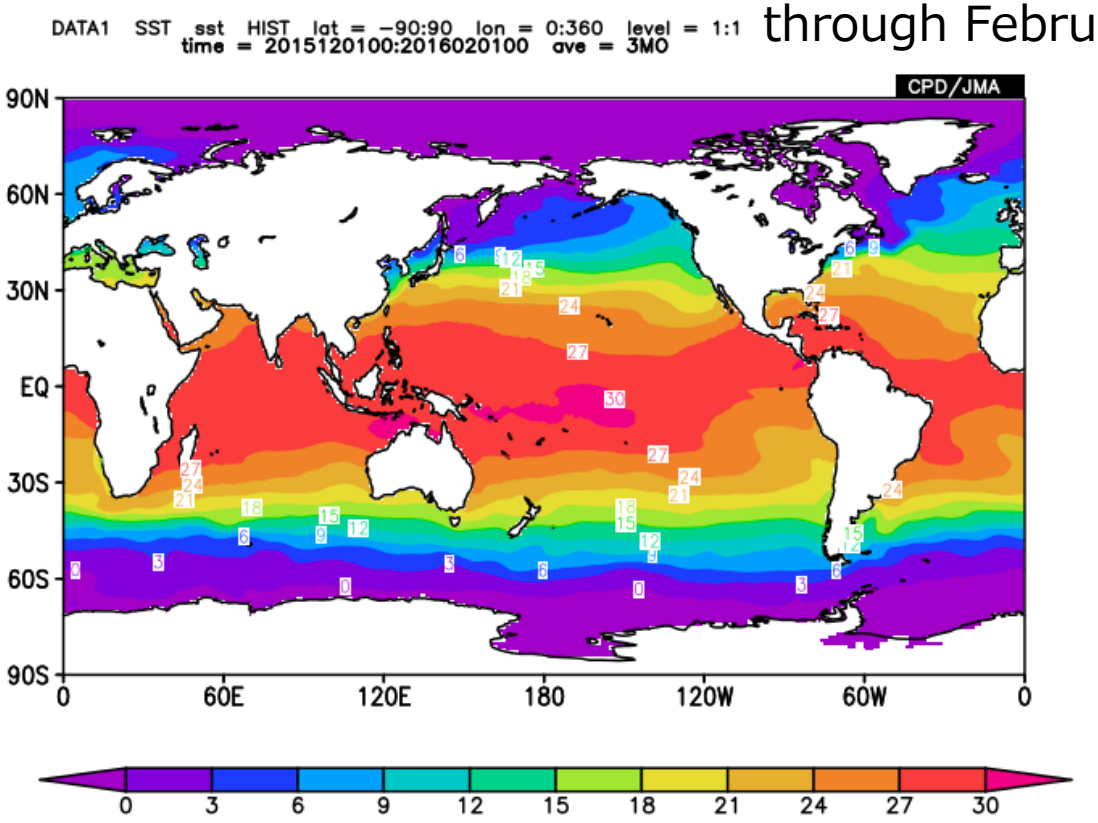
A1-1: X-Y map –time average(1)–



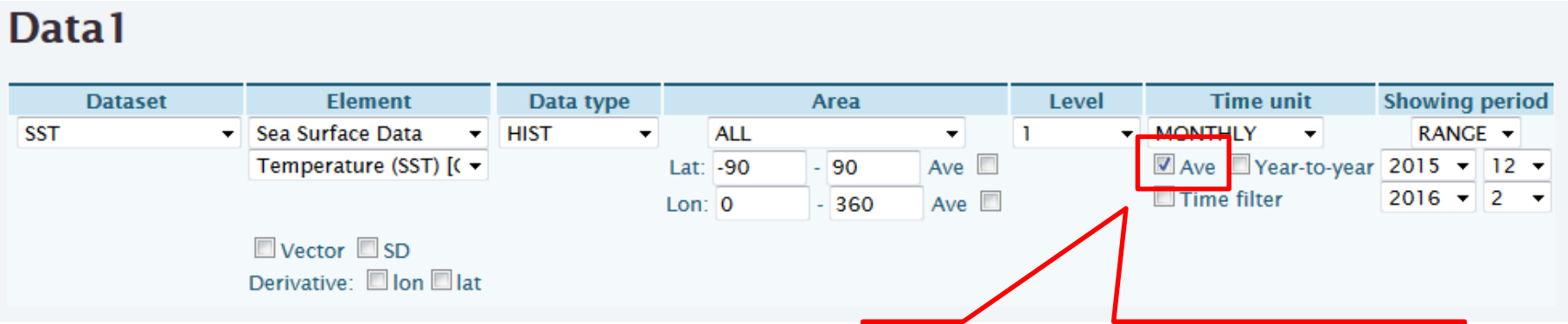
Q1-2: X-Y map –time average(1)–

Make a 3-month-mean SST map for the period from December 2015 through February 2016.

Variable: SST (hist)
Period: December 2015 through February 2016



A1-2: X-Y map –time average(1)–

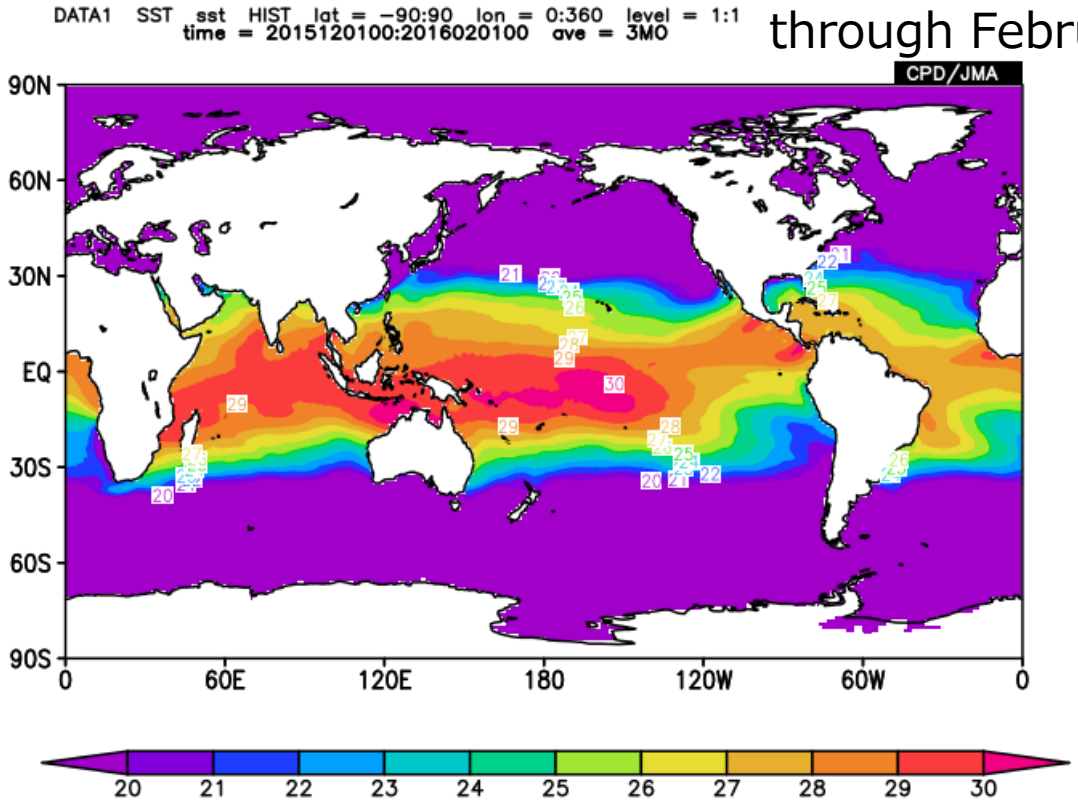


Don’t forget to check the average box.

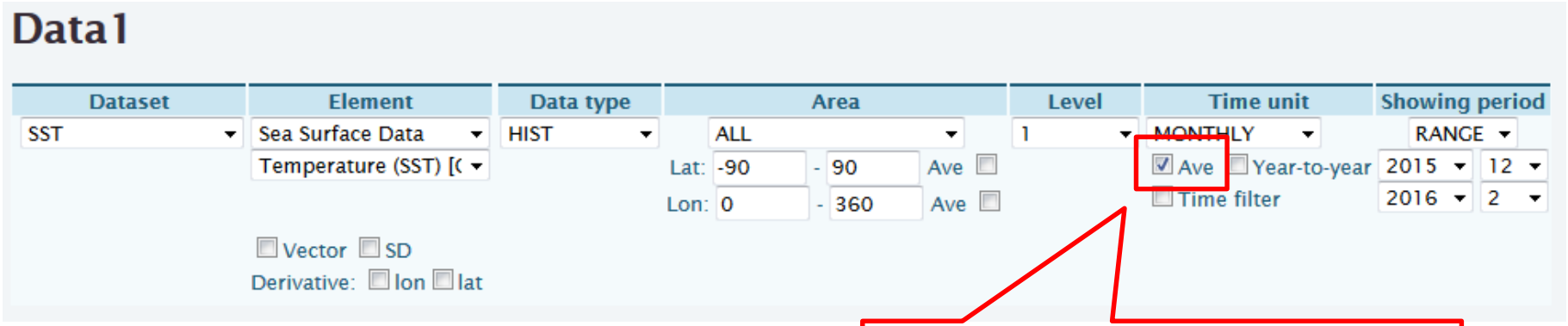
Q1-3: X-Y map –contour–

Modify the contour interval appropriately so as to see the SST structure in the Tropics.

Variable: SST (hist)
Period: December 2015 through February 2016



A1-3: X-Y map –contour–



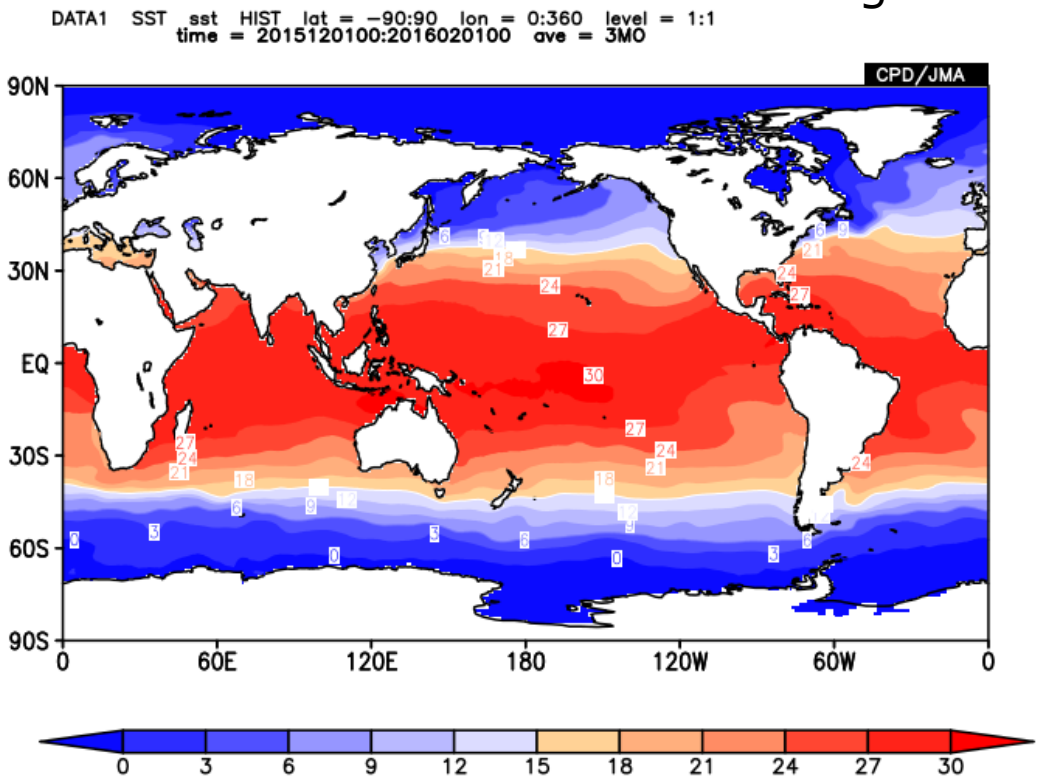
Don’t forget to check the average box.

This is just an example.
Please modify it as you like.

Q1-4: X-Y map –color table–

Change the color table as you like.

Variable: SST (hist)
Period: December 2015 through February 2016



“Blue - Red” is used for this example.

A1-4: X-Y map –color table–

Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
SST	Sea Surface Data	HIST	ALL	1	MONTHLY	RANGE
	Temperature (SST) [(		Lat: -90 - 90 Ave		Ave / Year-to-year	2015 12
			Lon: 0 - 360 Ave		Time filter	2016 2

Vector SD
Derivative: lon lat

Don’t forget to check the average box.

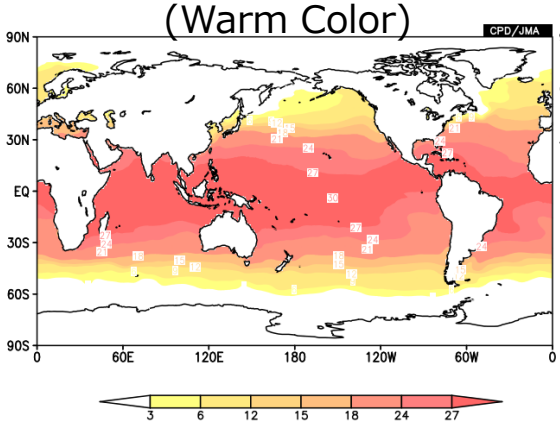
Graphic Options

Colorizing: COLOR
Drawing: SHADE
Image Format: png
Font: default
Color Table: Blue - Red

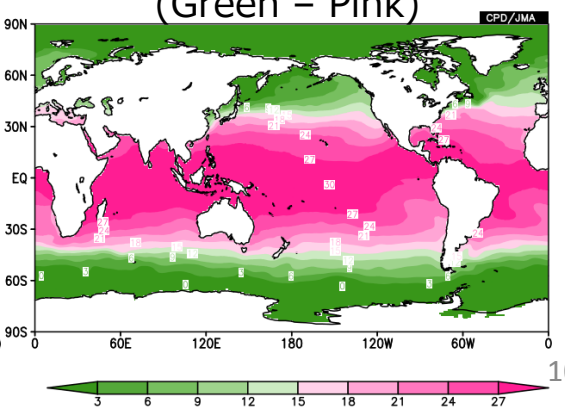
Show Contour Labels
Show Color Bar
Set Contour Parameters for data1
interval: min: max:
Set Vector size: [inch] value: skip: 1

Other color tables……

(Warm Color)



(Green – Pink)



Q1-5: X-Y map –Drawing area–

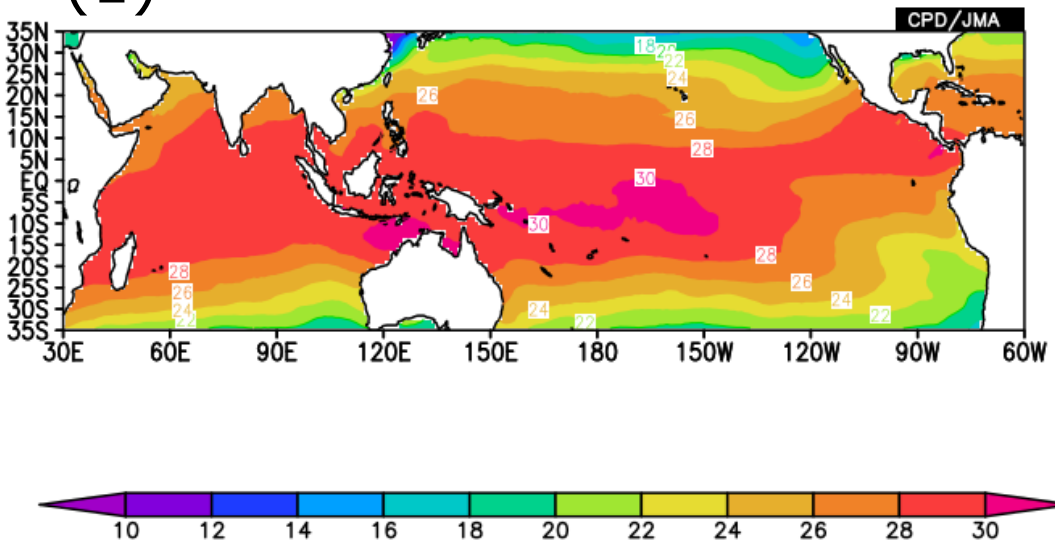
Change the area.

(1) The Indian Ocean and the Pacific

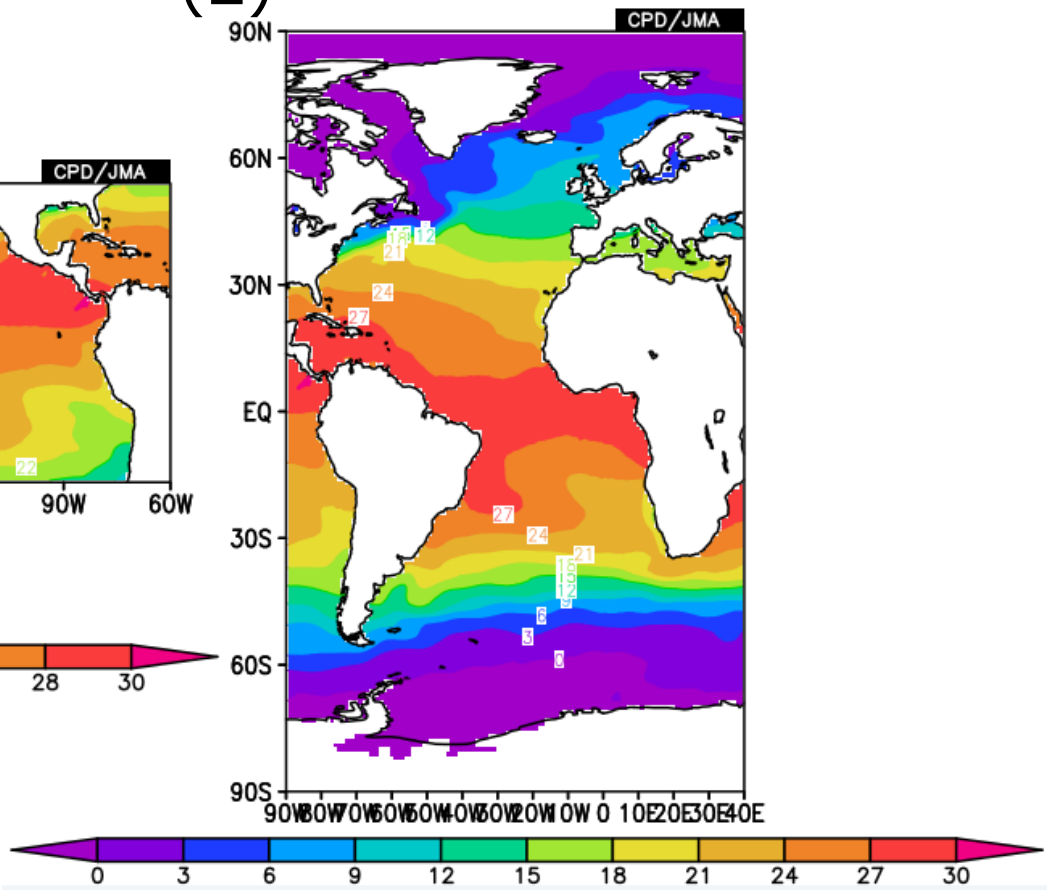
(2) The Atlantic

Variable: SST (hist)
Period: December 2015 through February 2016

(1)

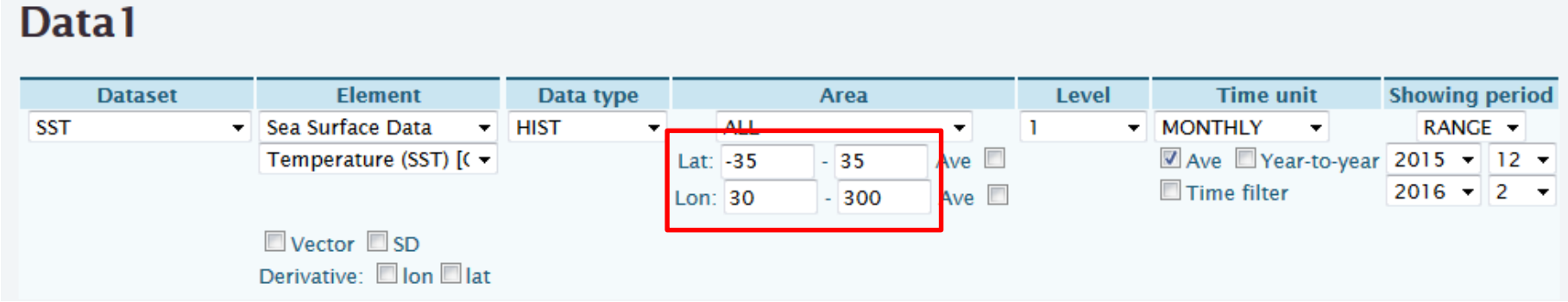


(2)

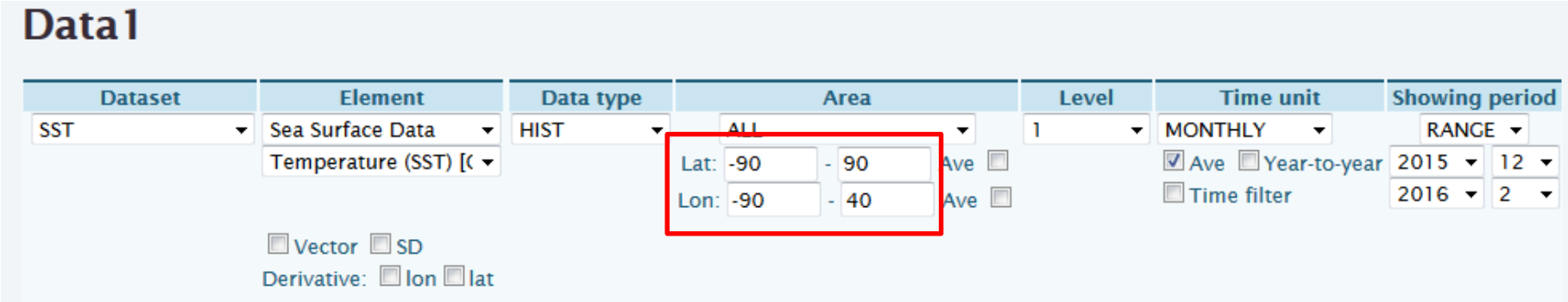


A1-5: X-Y map –mapping area–

(1) The Indian Ocean and the Pacific



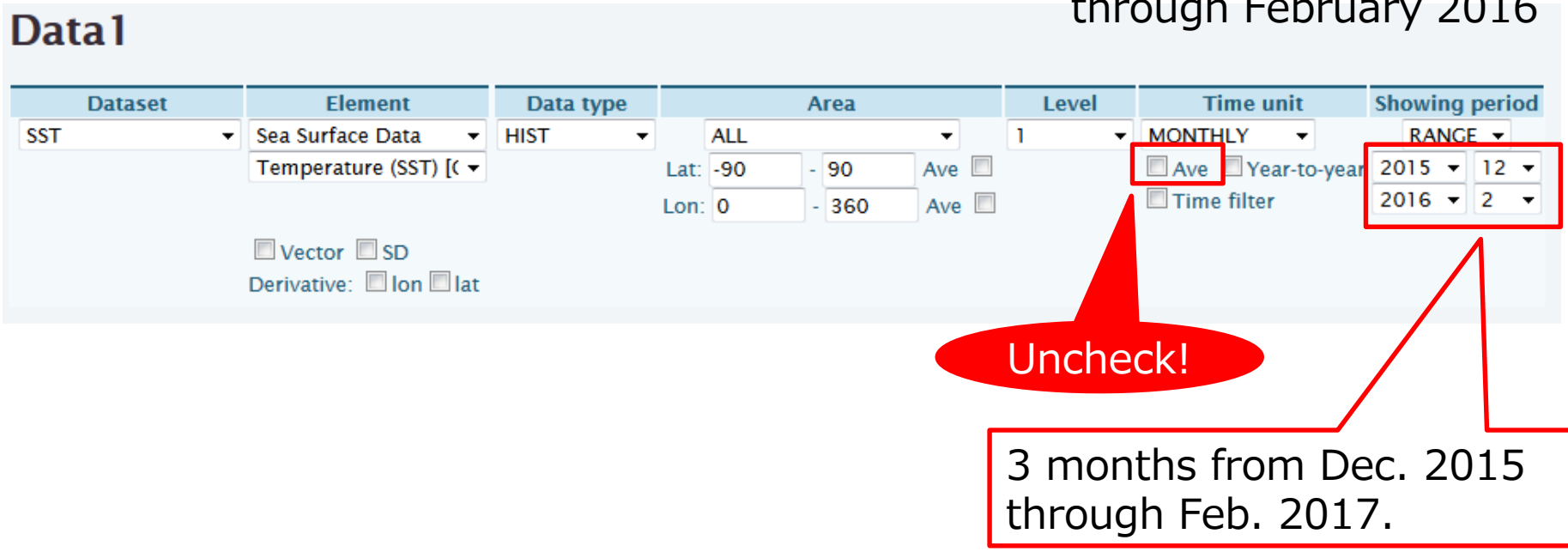
(2) The Atlantic Ocean



Q1-6: X-Y map –time average (2)–

If you uncheck the average box, what will happen?

Variable: SST (hist)
Period: December 2015 through February 2016



A1-6: X-Y map –time average (2)–

Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
SST	Sea Surface Data	HIST	ALL	1	MONTHLY	RANGE
	Temperature (SST) [(		Lat: -90 - 90 Ave		Ave Year-to-year	2015 12
			Lon: 0 - 360 Ave		Time filter	2016 2

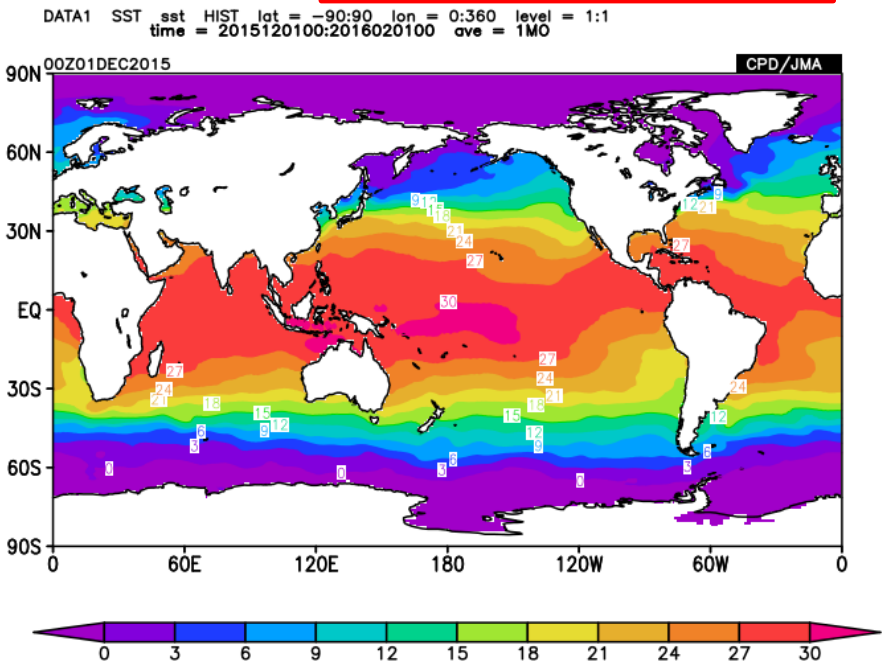
Vector SD

Derivative: lon lat

prev next animation stop reset

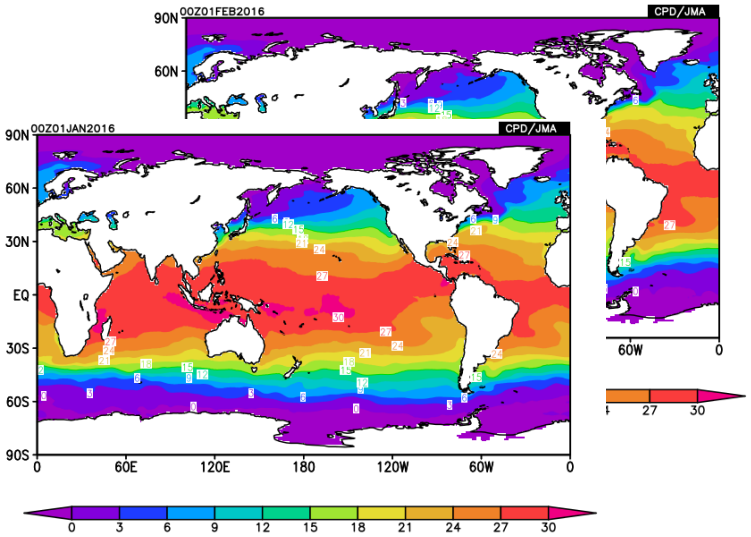
Image 1

Click “prev”/”next” to see other figures.



You will get 3 maps of monthly mean SST for December, January and February.

&

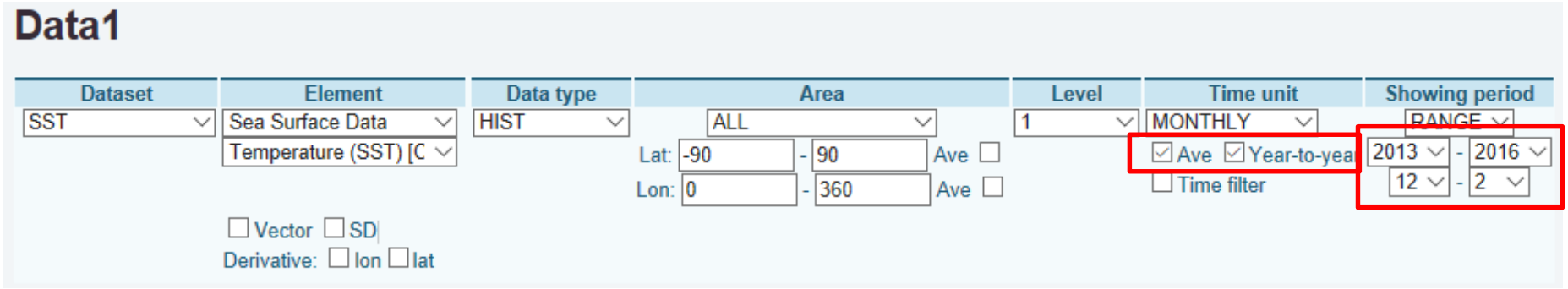


Q1-7: X-Y map –"Year-to-year"–

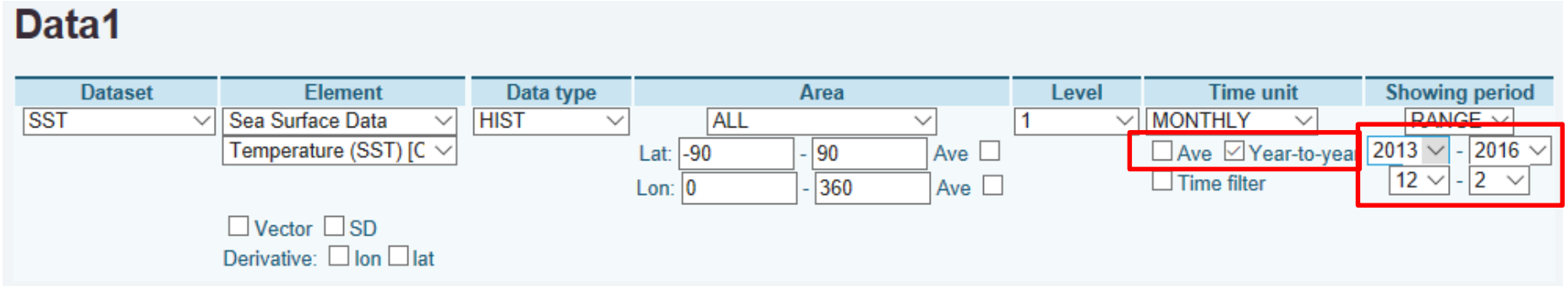
Let's see the "year-to-year" function.

Variable: SST (hist)
Period: December 2013 through February 2016

(1) Check both "Ave" and "Year-to-year"

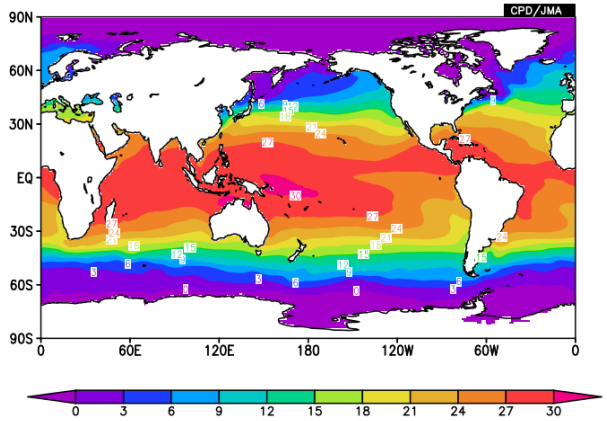


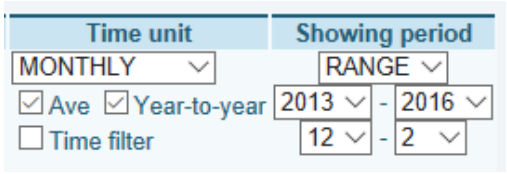
(2) Check only "Year-to-year"



A1-7: X-Y map –"Year-to-year"–

(1) Check both "Ave" and "Year-to-year"

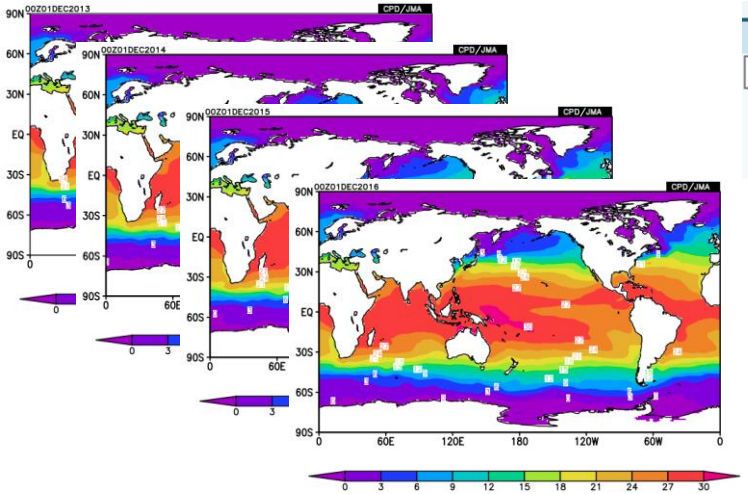


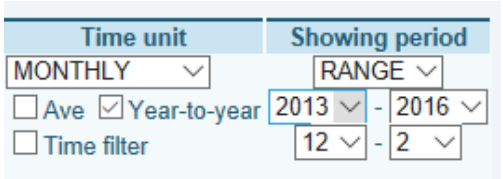


Selecting consecutive DJF-means from each year and averaging them further.

2013 … J J A S O N D **2014** J F M A …
2014 … J J A S O N D **2015** J F M A …
2015 … J J A S O N D **2016** J F M A …
2016 … J J A S O N D **2017** J F M A …

(2) Check only "Year-to-year"





Selecting consecutive DJF-means from each year and drawing them separately.

2013 … J J A S O N D **2014** J F M A …
2014 … J J A S O N D **2015** J F M A …
2015 … J J A S O N D **2016** J F M A …
2016 … J J A S O N D **2017** J F M A …

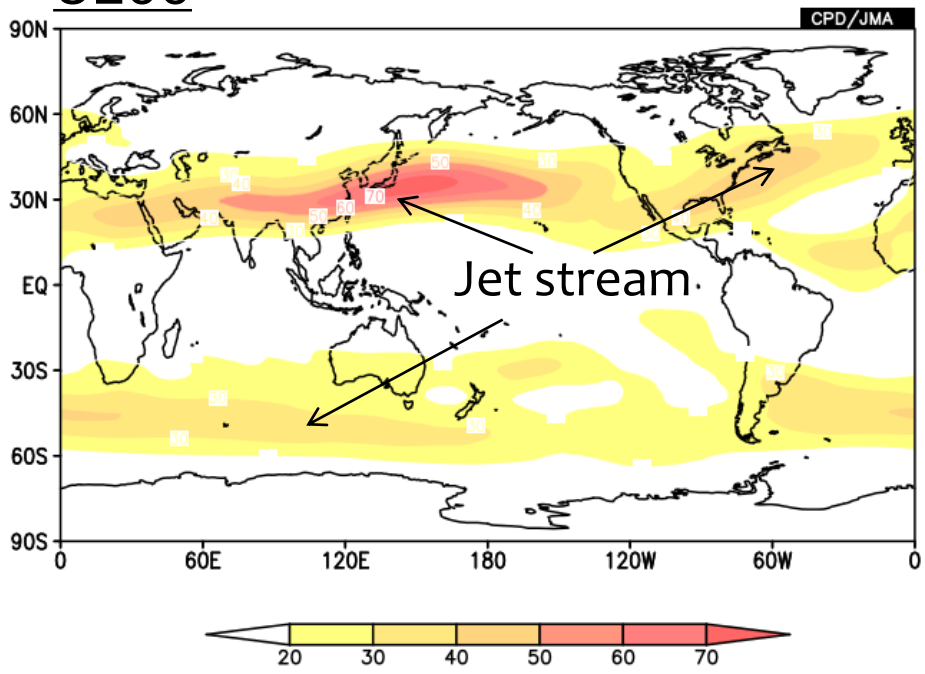
<!> For both cases, the end of period is apparently Feb. 2016, but it is Feb. 2017, actually.

Q1-8: X-Y map –Integrated exercise–

Change the variable to zonal wind (U) and select upper-level (200hPa) and lower-level (850hPa). It would be better to change also some graphical options as appropriate to highlight their characteristics .

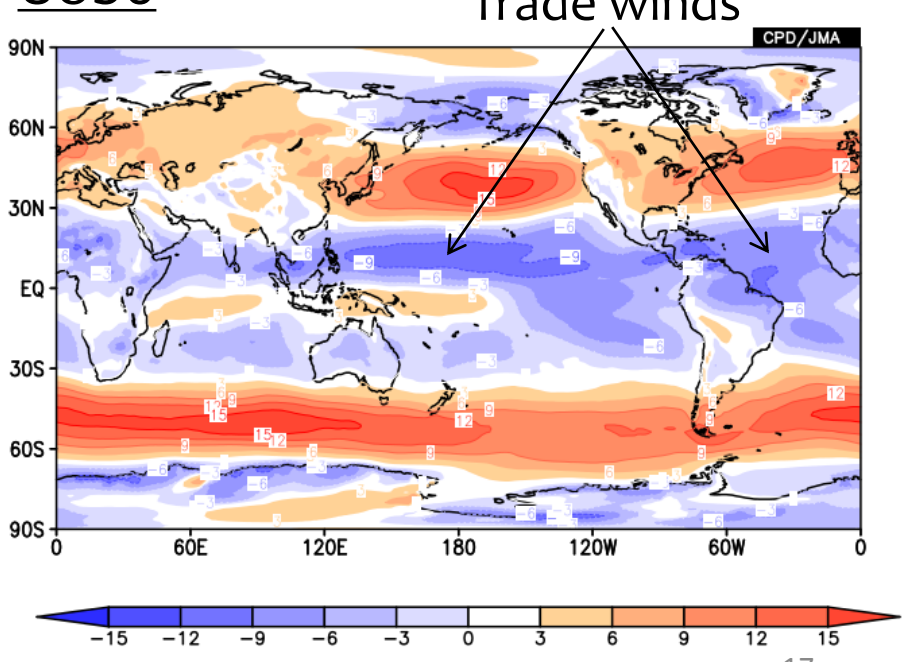
Variable: U200 (hist)
Period: December 2015 through February 2016

U200



Variable: U850 (hist)
Period: December 2015 through February 2016

U850



A1-8: X-Y map –Integrated exercise–

Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	HIST	ALL Lat: -90 - 90 Ave Lon: 0 - 360 Ave	200hPa	MONTHLY Ave / Year-to-year Time filter	RANGE 2015 12 2016 2

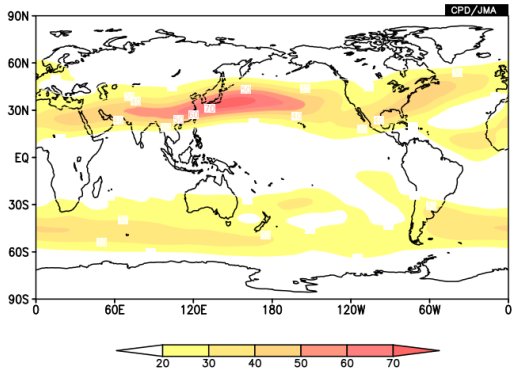
Vector SD
Derivative: lon lat

Graphic Options

U200

Colorizing: COLOR
Drawing: SHADE
Image Format: png
Font: default
Color Table: Warm Color

Show Contour Labels
Show Color Bar
Set Contour Parameters for data1
interval: 10 min: 20 max: 70
Set Vector size: [inch] value: skip: 1

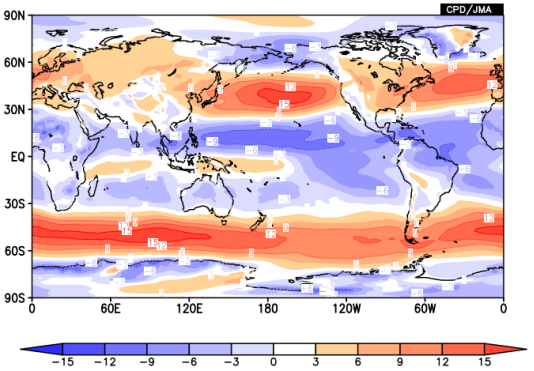


Graphic Options

U850

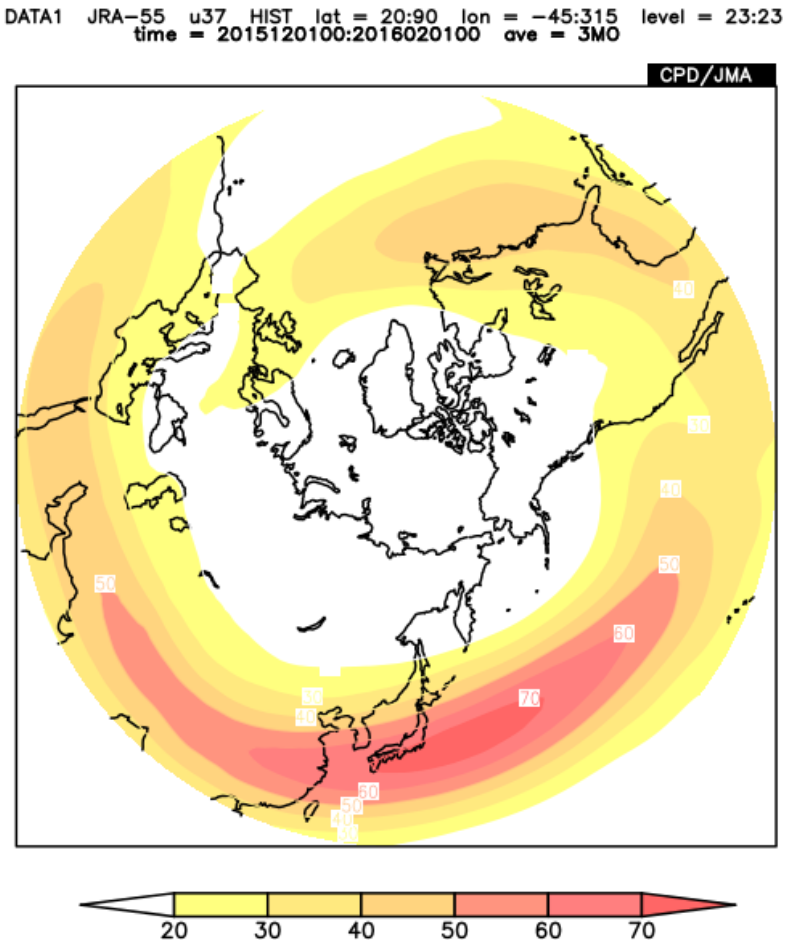
Colorizing: COLOR
Drawing: SHADE
Image Format: png
Font: default
Color Table: Blue - Red

Show Contour Labels
Show Color Bar
Set Contour Parameters for data1
interval: 3 min: -15 max: 15
Set Vector size: [inch] value: skip: 1



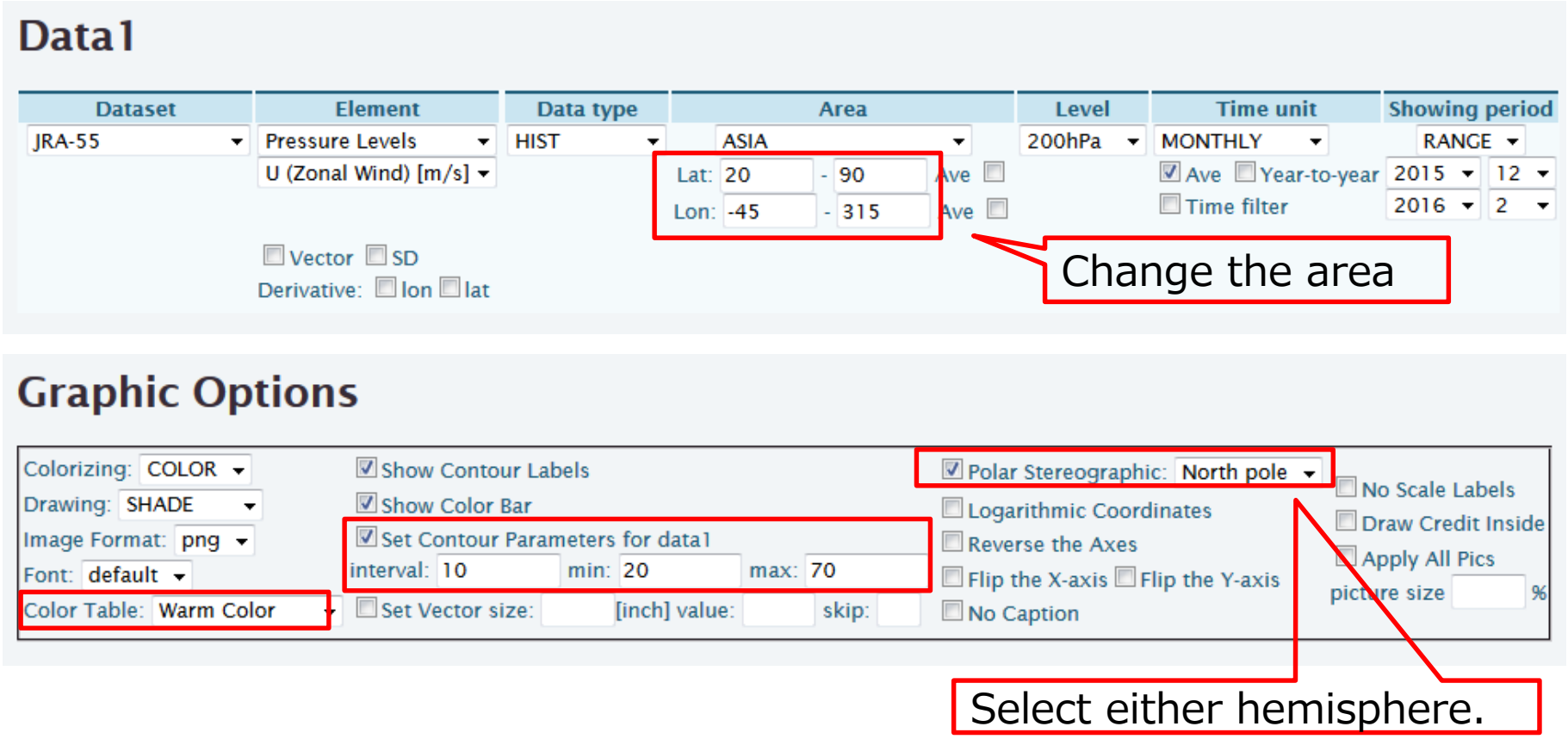
Q1-9: X-Y map –Polar stereo map–

Polar stereo map is good for the extratropics.



Variable: U200 (hist)
Period: December 2015 through February 2016

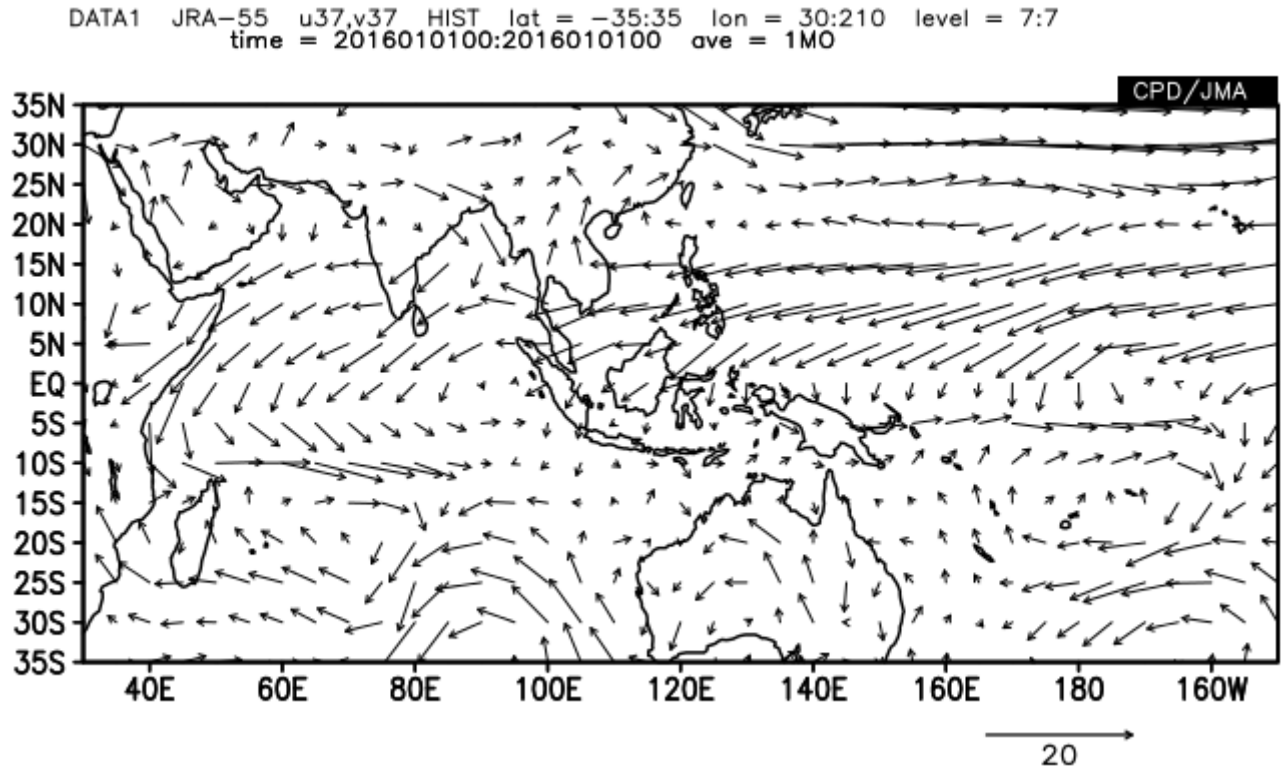
A1-9: X-Y map –Polar stereo map–



Q2-1:Vector

Let's see 850hPa winds in January 2016. Let the area be [35S-35N, 30E-150W].

Variable: U850, V850 (hist)
Period: January 2016
Vector: 1 inch =20m/s, skip interval=4



A2-1:Vector

Data1

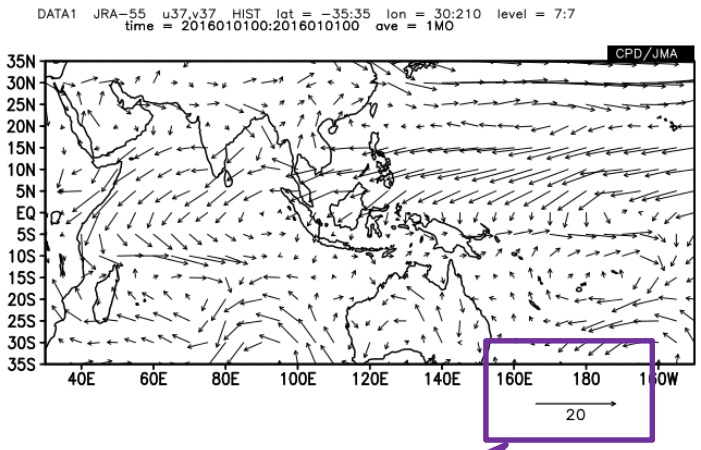
Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	HIST	ASIA Lat: -35 - 35 Ave Lon: 30 - 210 Ave	850hPa	MONTHLY Ave Year-to-year Time filter	RANGE 2016 1 2016 1

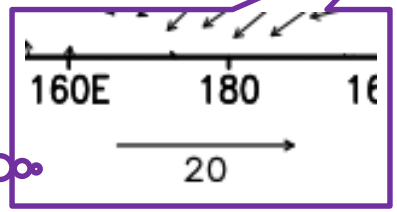
Pressure Levels
V (Meridional Wind) |
x: Stream line
Vector SD
Derivative: lon lat

Graphic Options

Colorizing: COLOR
Drawing: SHADE
Image Format: png
Font: default
Color Table: Rainbow

Show Contour Labels
Show Color Bar
Set Contour Parameters for data1
interval: min: max:
Set Vector size: 1 [inch] value: 20 skip: 4



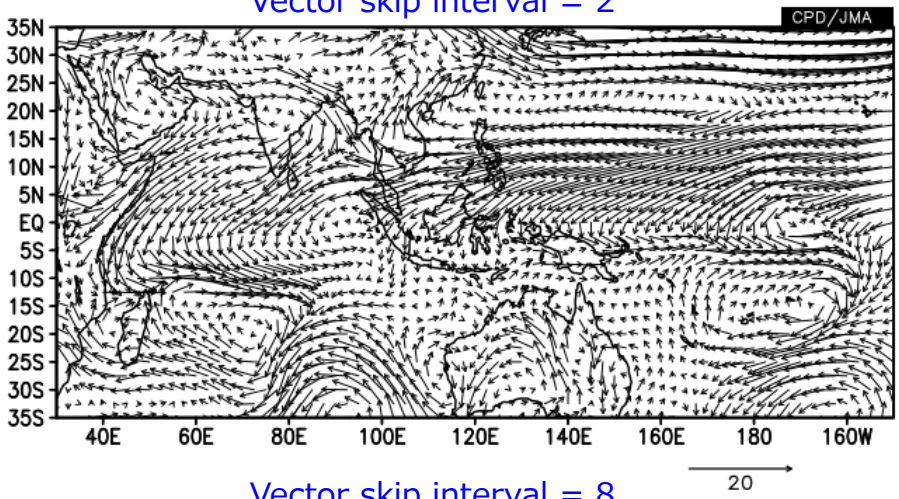


1 inch = 20 m/s

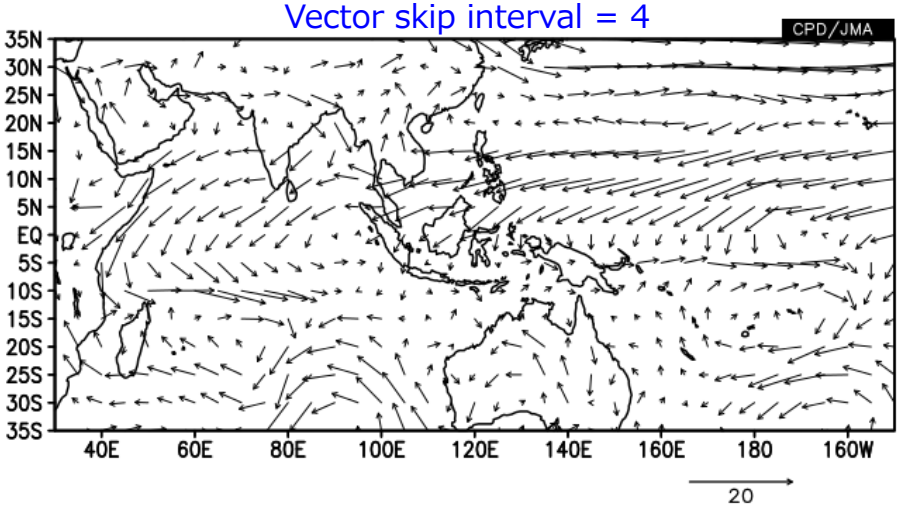
Q2-2:Vector –skip interval–

In Q2-1, we set the vector skip interval as 4.
Change this parameter as you like.

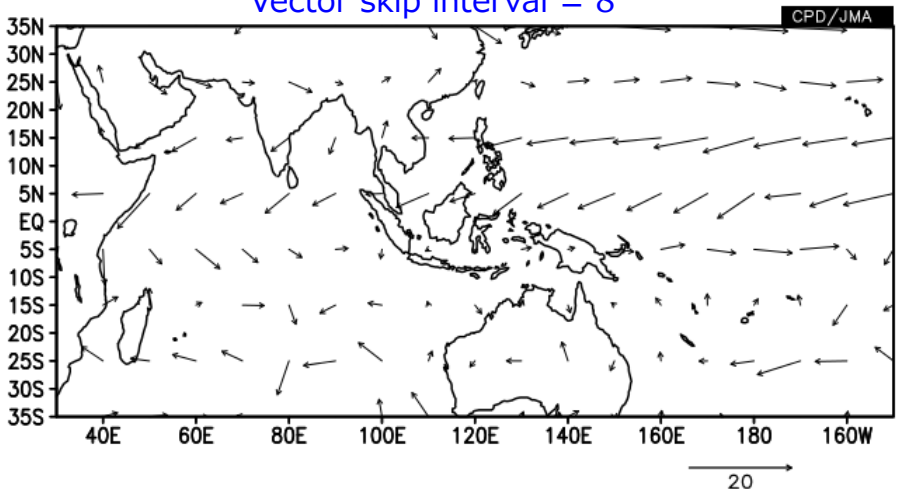
Vector skip interval = 2



Vector skip interval = 4



Vector skip interval = 8



A2-2:Vector –skip interval–

Data1

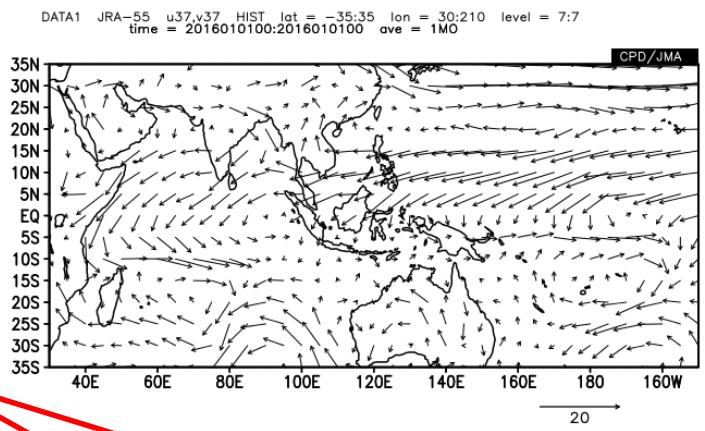
Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	HIST	ASIA Lat: -35 - 35 Ave Lon: 30 - 210 Ave	850hPa	MONTHLY Ave Year-to-year Time filter	RANGE 2016 1 2016 1

Pressure Levels
V (Meridional Wind) |
x: Stream line
Vector SD
Derivative: lon lat

Graphic Options

Colorizing: COLOR
Drawing: SHADE
Image Format: png
Font: default
Color Table: Rainbow

Show Contour Labels
Show Color Bar
Set Contour Parameters for data1
interval: min: max:
Set Vector size: 1 [inch] value: 20 skip: 4

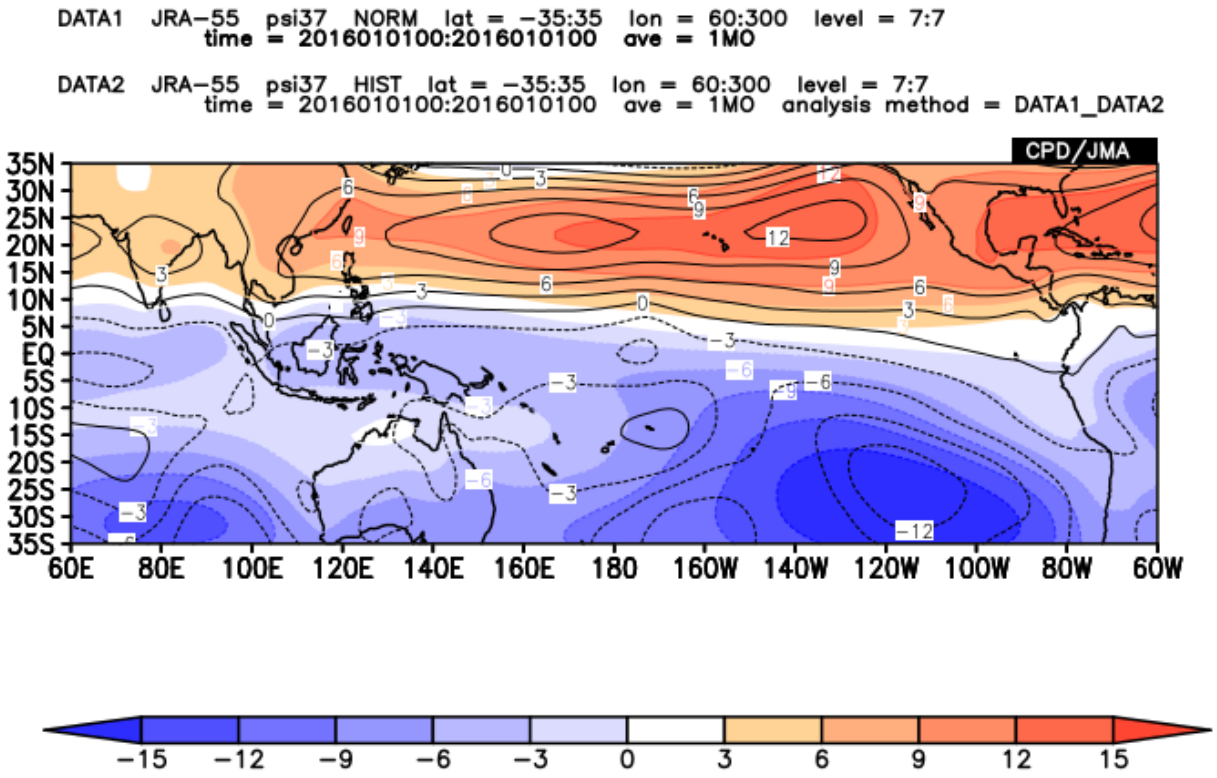


Change this parameter as you like.

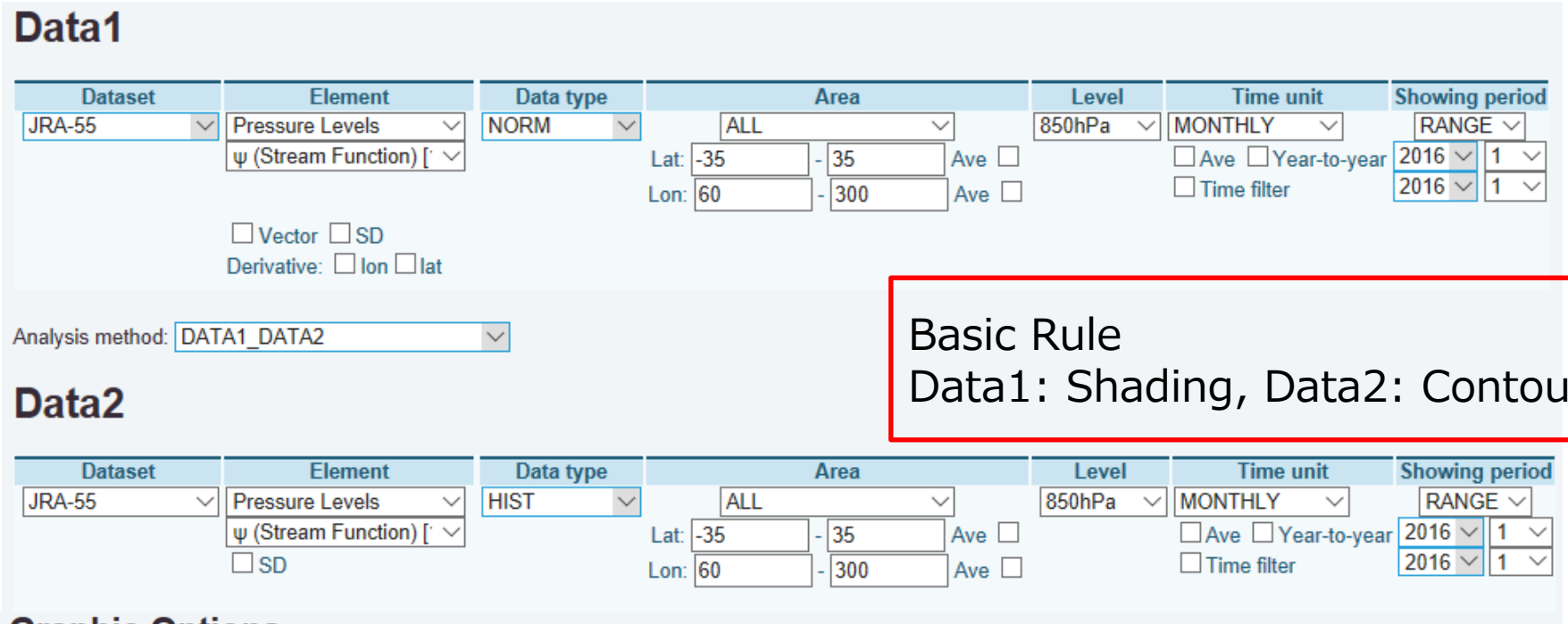
Q3-1:Data1_Data2 –Shade & Contour–

Show the stream function normal at 850hPa for January by shading and also overlay the same variable for January 2016 by contour lines.

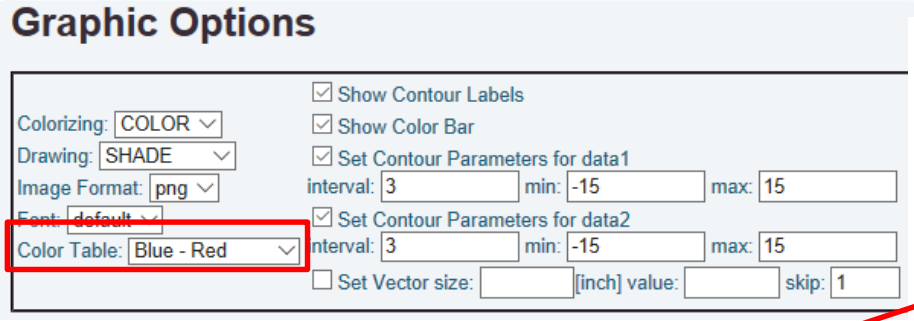
Variable: ψ850
Period: January 2016

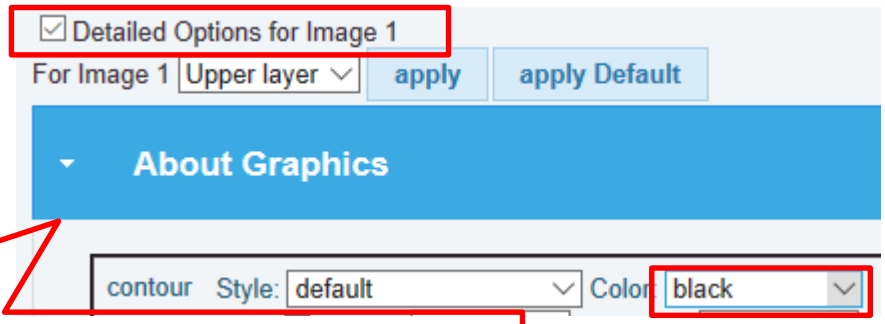


A3-1:Data1_Data2 –Shade & Contour–



Basic Rule
Data1: Shading, Data2: Contour



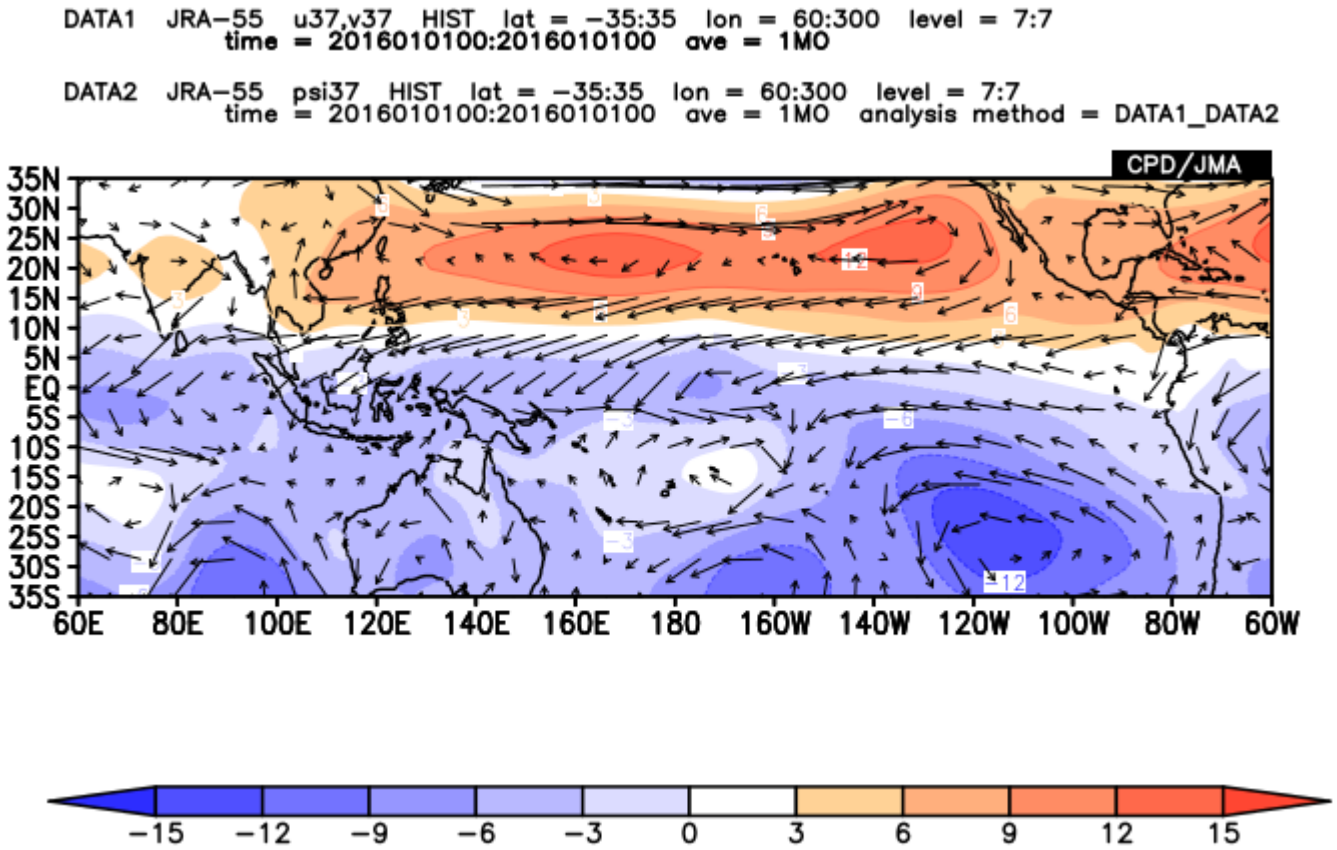


To change the contour color, please check detailed options box and set the contour color black for Upper layer.

Q3-2:Data1_Data2 –Shade & Vector–

Next, show the wind vectors and stream function at 850hPa for January 2016.

Variable: U850, V850, ψ850
Period: January 2016



A3-2:Data1_Data2 –Shade & Vector–

Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	HIST	ALL Lat: -35 - 35 Ave ☐ Lon: 60 - 300 Ave ☐	850hPa	MONTHLY ☐ Ave ☐ Year-to-year ☐ Time filter	RANGE 2016 1 2016 1

Pressure Levels
V (Meridional Wind) [r
x: ☐ Stream line
☑ Vector ☐ SD
Derivative: ☐ lon ☐ lat

Analysis method: DATA1 DATA2

An important Exception:
Vector must be set as Data1.

Data2

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels ψ (Stream Function) [☐ SD	HIST	ALL Lat: -35 - 35 Ave ☐ Lon: 60 - 300 Ave ☐	850hPa	MONTHLY ☐ Ave ☐ Year-to-year ☐ Time filter	RANGE 2016 1 2016 1

Graphic Options

Colorizing: COLOR
Drawing: SHADE
Image Format: png
Font: default
Color Table: Blue - Red

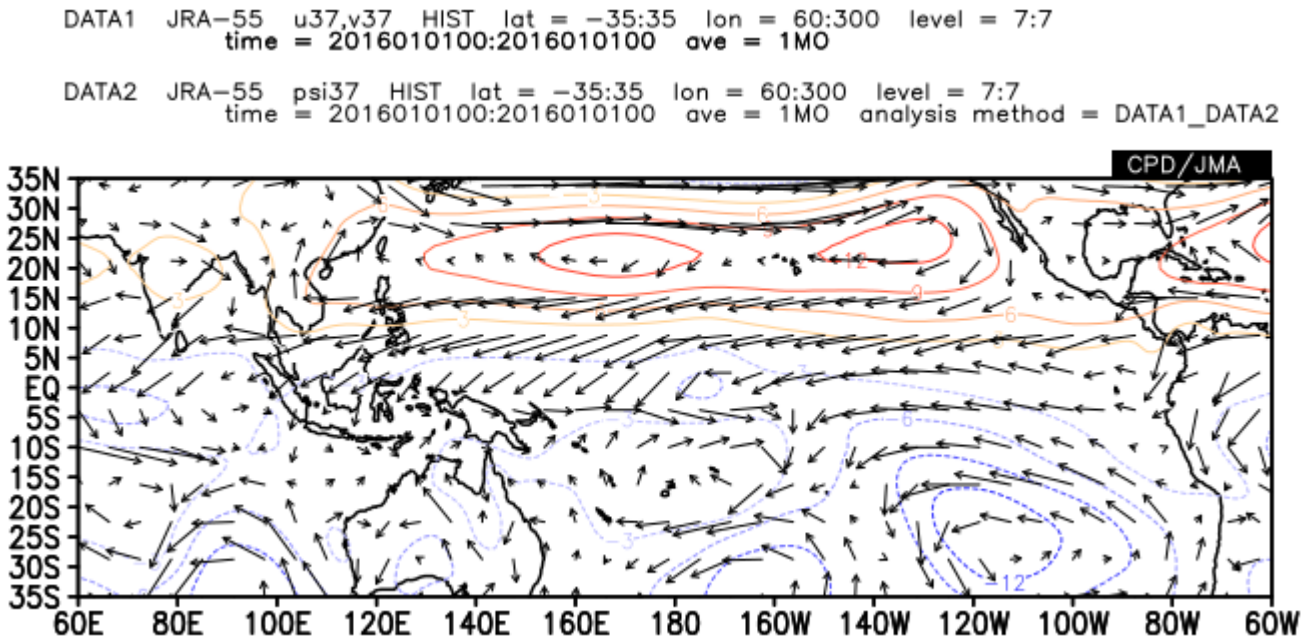
☑ Show Contour Labels
☑ Show Color Bar
☐ Set Contour Parameters for data1
interval: min: max:
☑ Set Contour Parameters for data2
interval: 3 min: -15 max: 15
☑ Set Vector size: 1 [inch] value: 20 skip: 5

Set graphic options as you like. This is jut an example.

Q3-3:Data1_Data2 –Contour & Vector–

Draw the stream function by contour lines.

Variable: U850, V850, ψ850
Period: January 2016



A3-3:Data1_Data2 –Contour & Vector–

Data1

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels U (Zonal Wind) [m/s]	HIST	ALL Lat: -35 - 35 Ave Lon: 60 - 300 Ave	850hPa	MONTHLY Ave Year-to-year Time filter	RANGE 2016 1 2016 1

Pressure Levels
V (Meridional Wind) [r
x: Stream line
Vector SD
Derivative: lon lat

Analysis method: DATA1 DATA2

Data2

Dataset	Element	Data type	Area	Level	Time unit	Showing period
JRA-55	Pressure Levels ψ (Stream Function) [SD	HIST	ALL Lat: -35 - 35 Ave Lon: 60 - 300 Ave	850hPa	MONTHLY Ave Year-to-year Time filter	RANGE 2016 1 2016 1

Graphic Options

Colorizing: COLOR
Drawing: CONTOUR
Image Format: png
Font: default
Color Table: Blue - Red

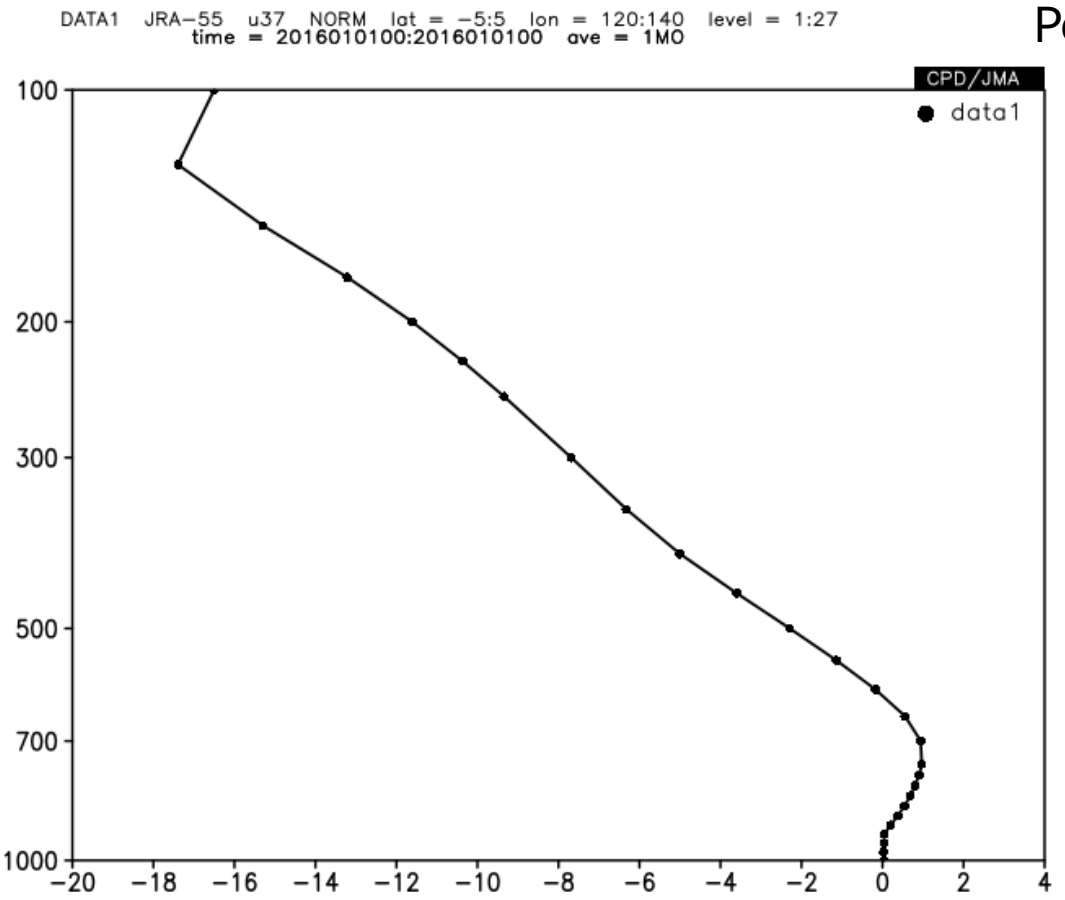
Show Contour Labels
Show Color Bar
Set Contour Parameters for data1
interval: min: max:
Set Contour Parameters for data2
interval: 3 min: -15 max: 15
Set Vector size: 1 [inch] value: 20 skip: 5

Difference is just one point, here.
Please select "CONTOUR" in this Drawing option box.

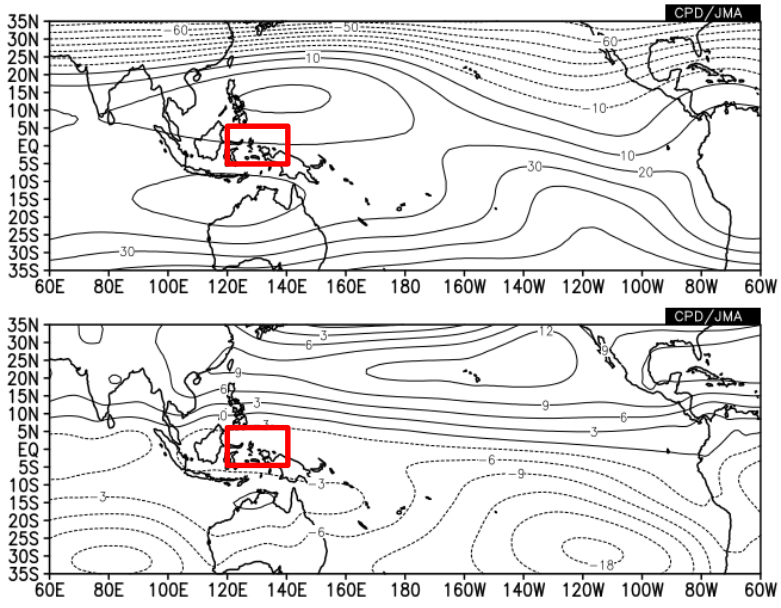
Q4-1:1D chart –vertical profile-

Show the vertical profile of climatological mean zonal winds averaged over the area [5S-5N, 120E-140E] for January.

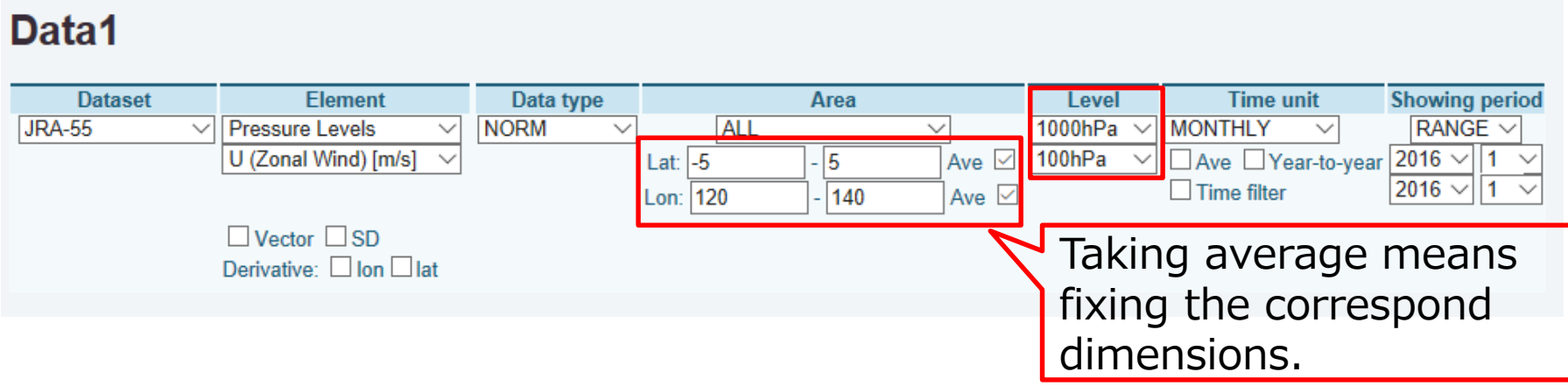
Variable: U
Period: January

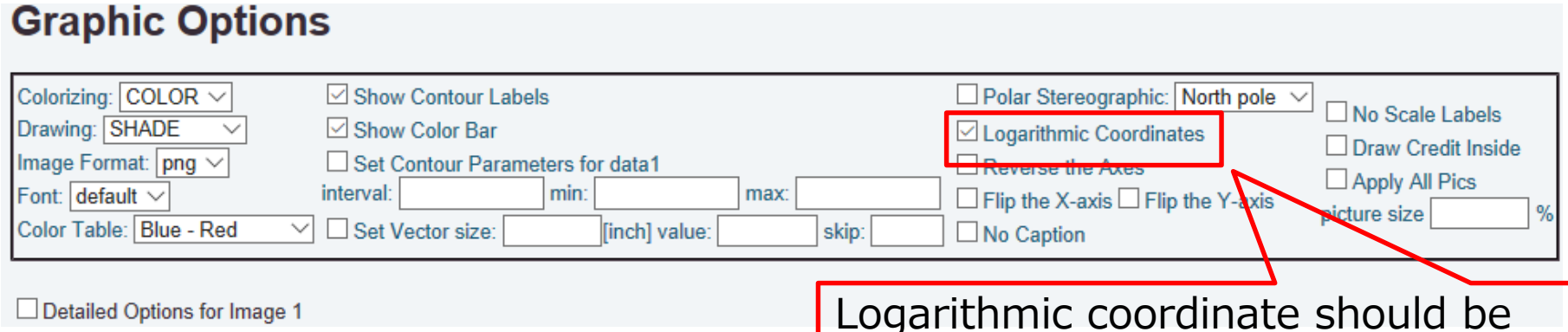


cf: ψ200 (upper panel) and 850 (below panel) normals. Red box is the target area.



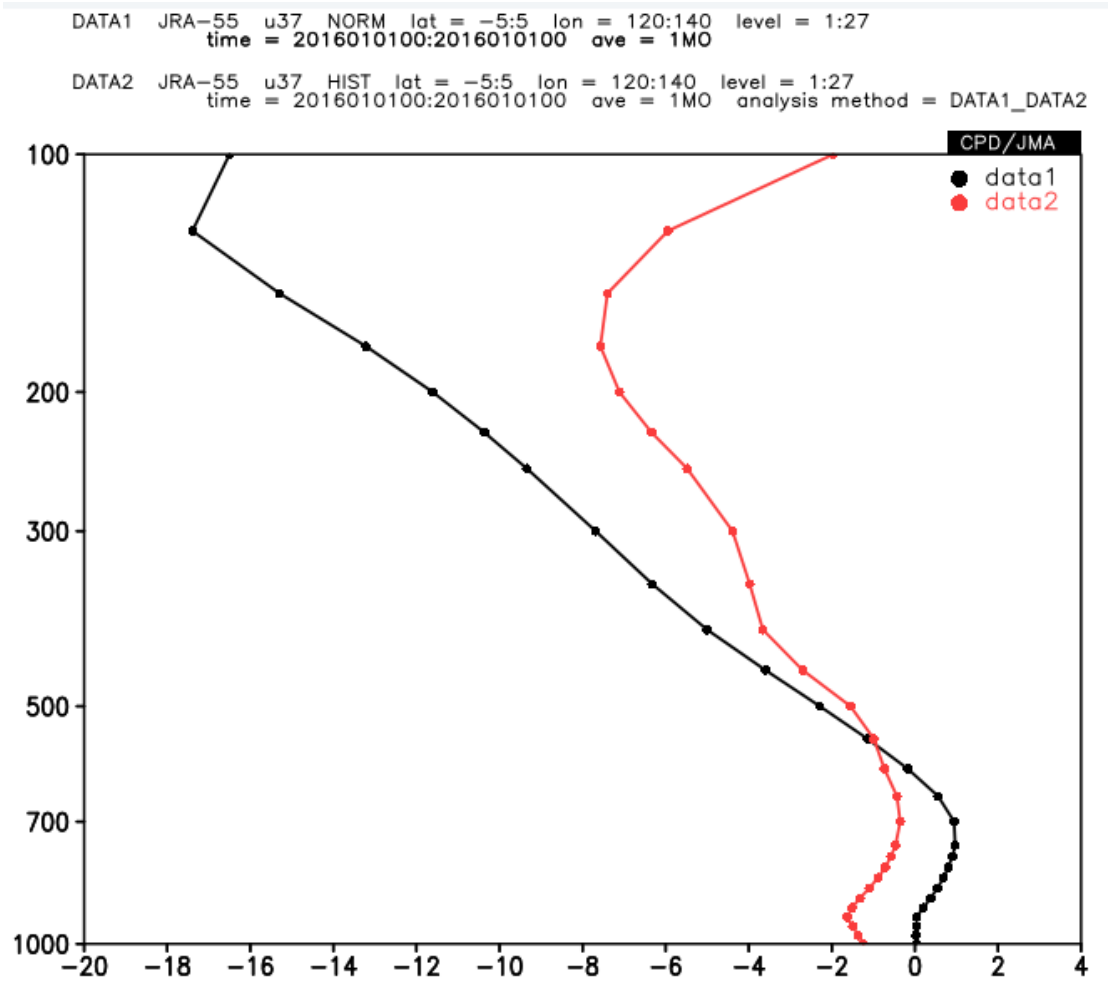
A4-1:1D chart –vertical profile-





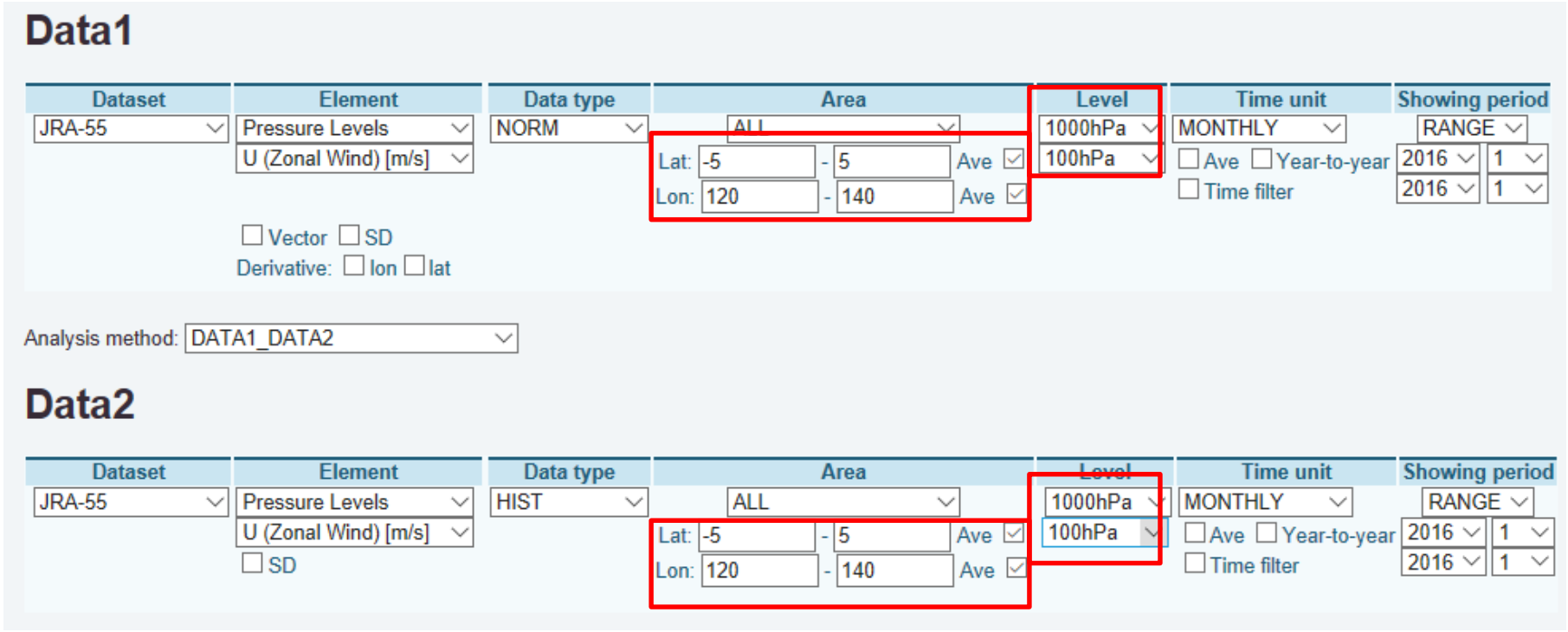
Q4-2:1D chart –vertical profile-

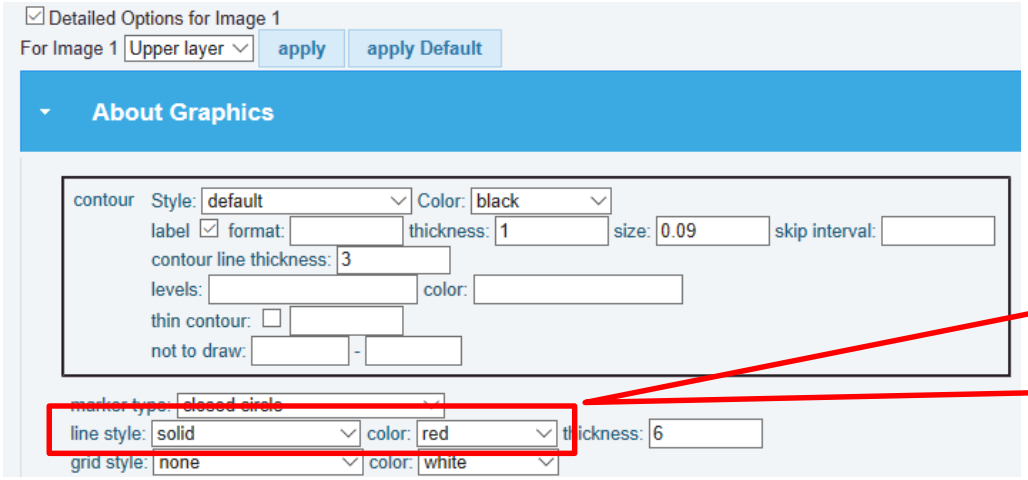
Next, also overlay the same profile but for January 2016 by the red line.



Variable: U
Period: January

A4-2:1D chart –vertical profile-

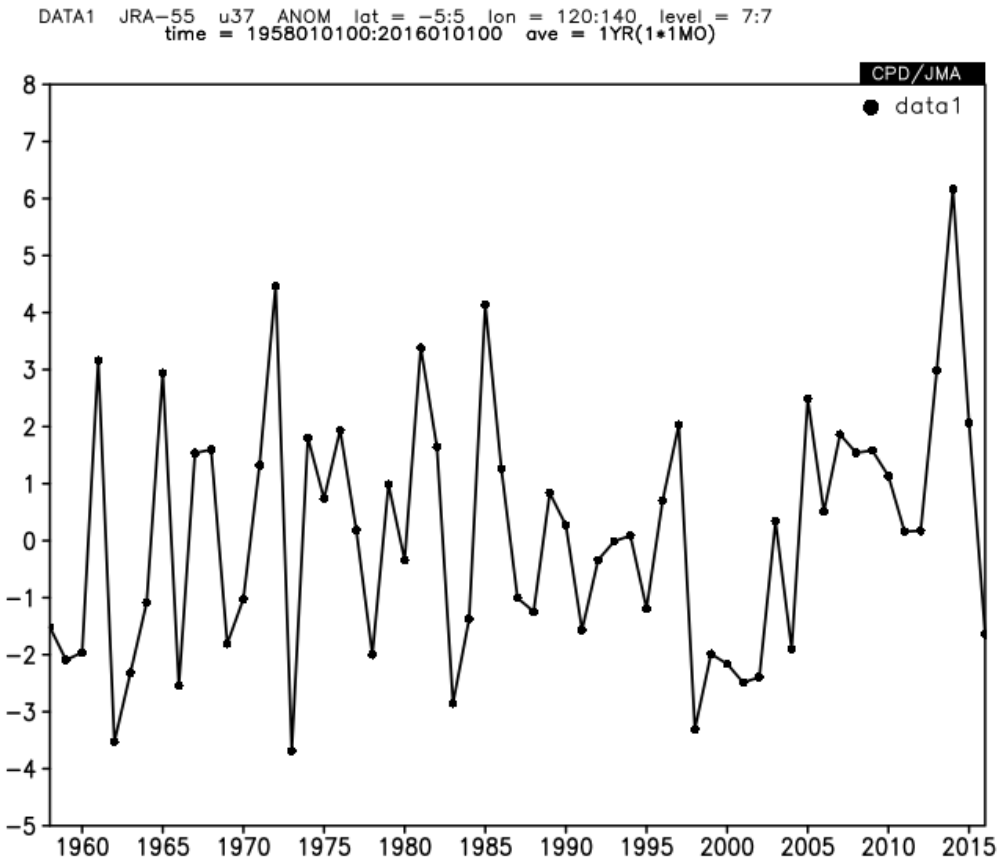




You can change line's color by modifying this graphic option. It also should be noted that Data2 is drawn on the Upper layer.

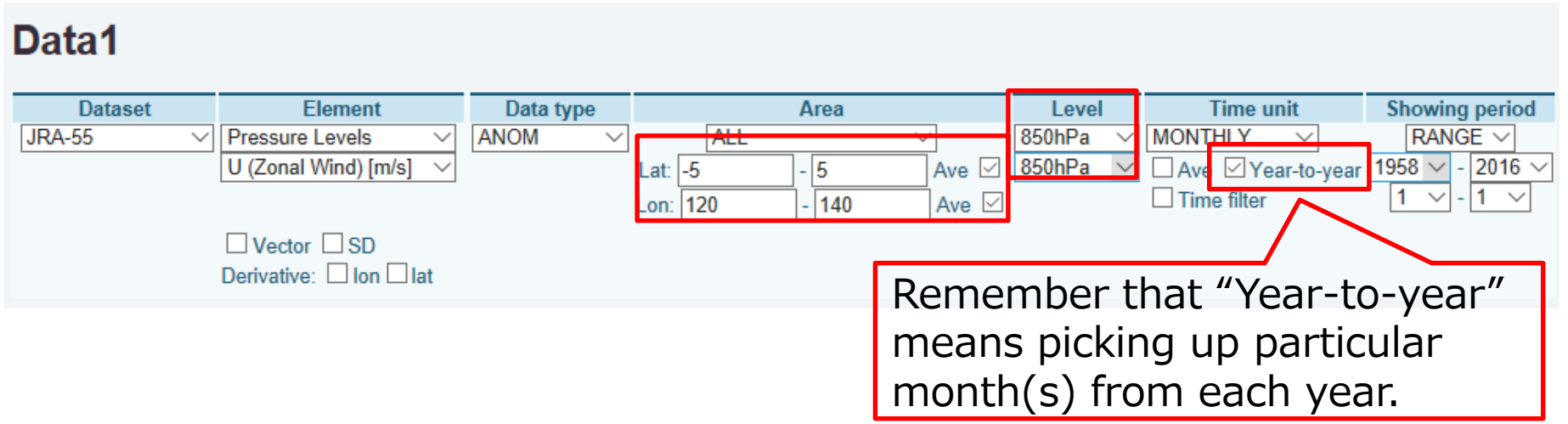
Q4-3:1D chart –time series-

Show the time series of zonal wind anomalies at 850hPa for January averaged over the same region as Q4-1 and 2. Let the showing period be from 1958 to 2016.



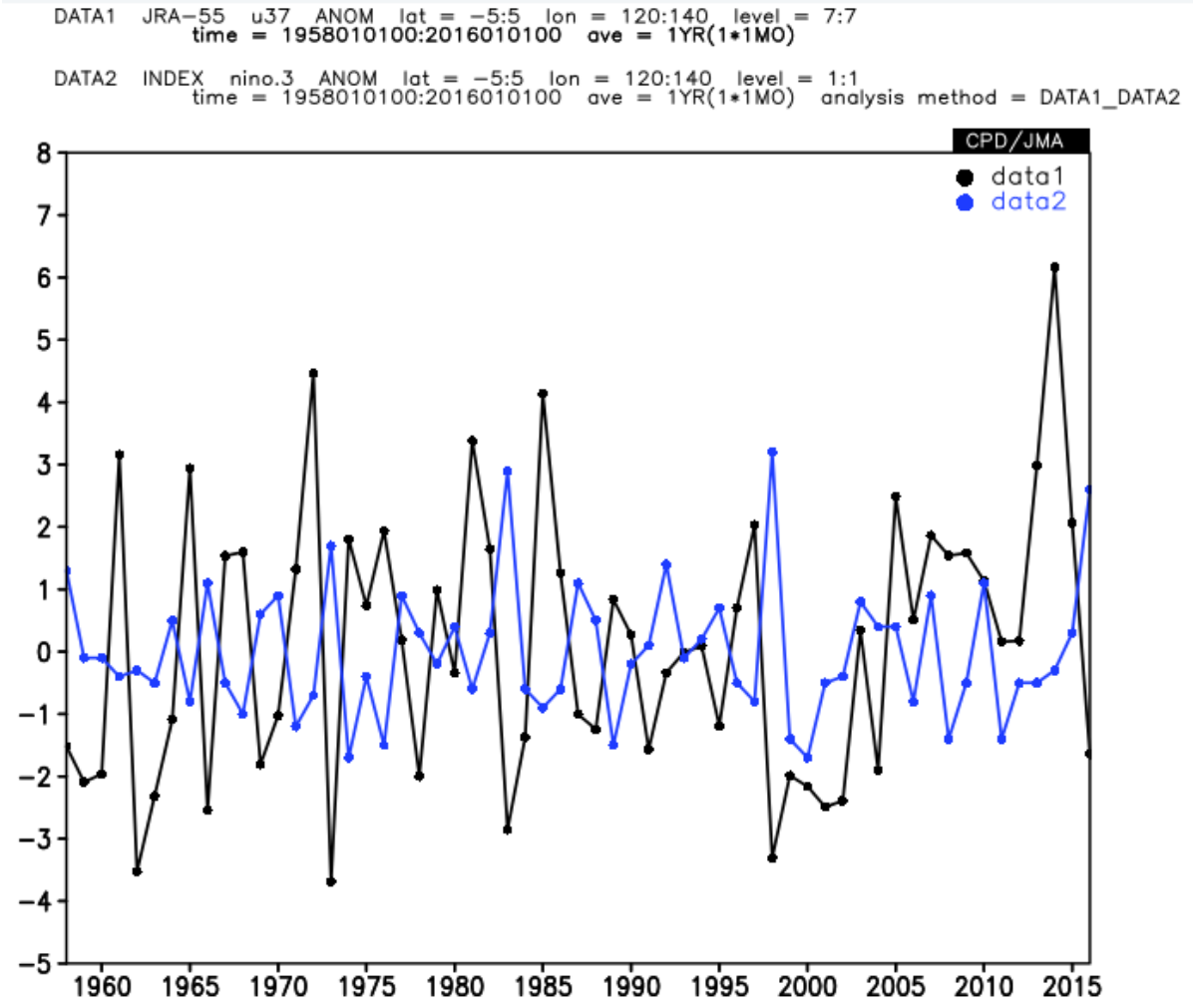
Variable: U850
Period: January (1958-2016)

A4-3:1D chart –time series-



Q4-4:1D chart –time series-

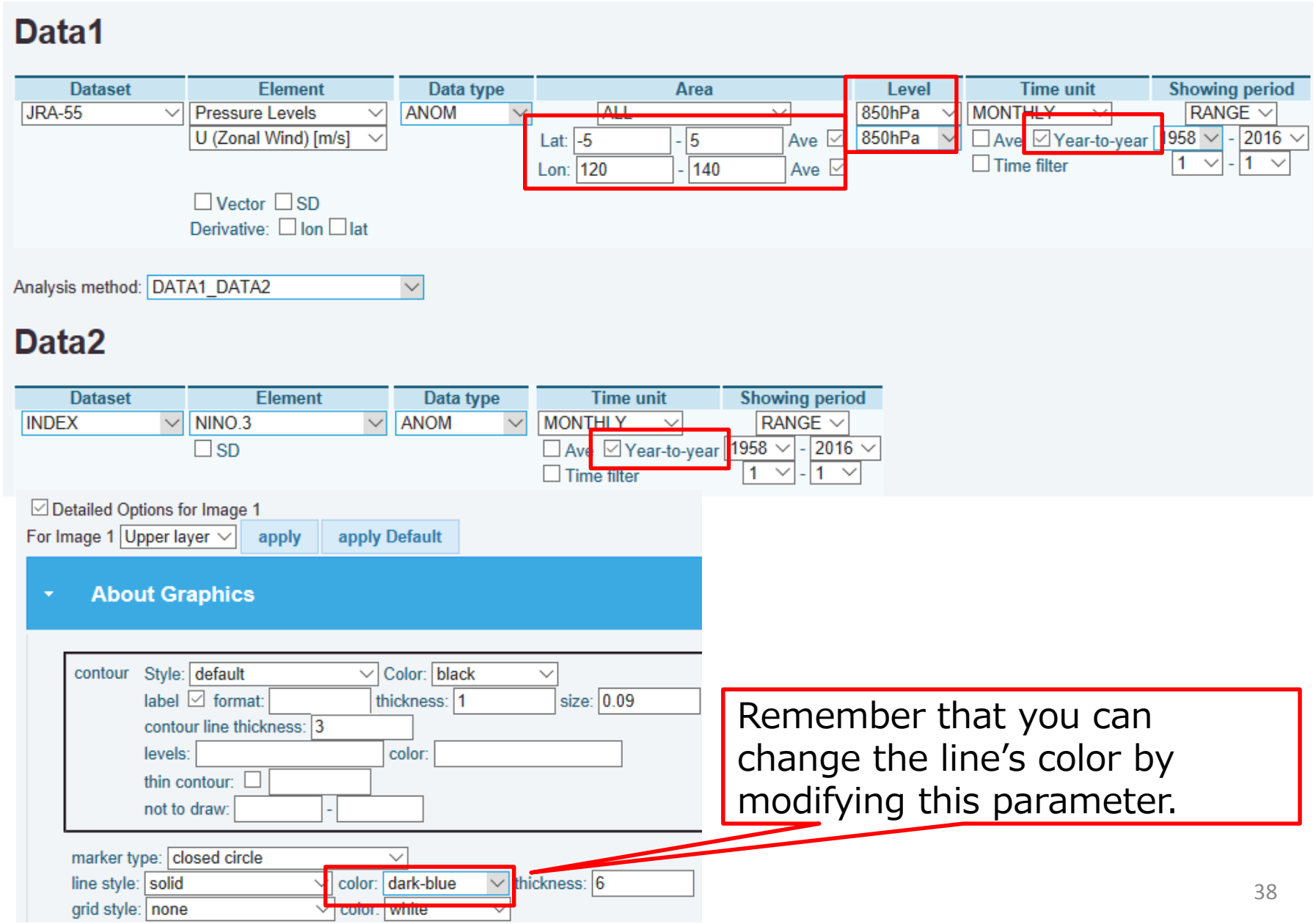
Overlay the NINO.3 SST index anoamlies by dark-blue line.



Variable: U850, NINO.3
Period: January (1958-2016)

……Can you find any relationship between them?

A4-4:1D chart –time series-

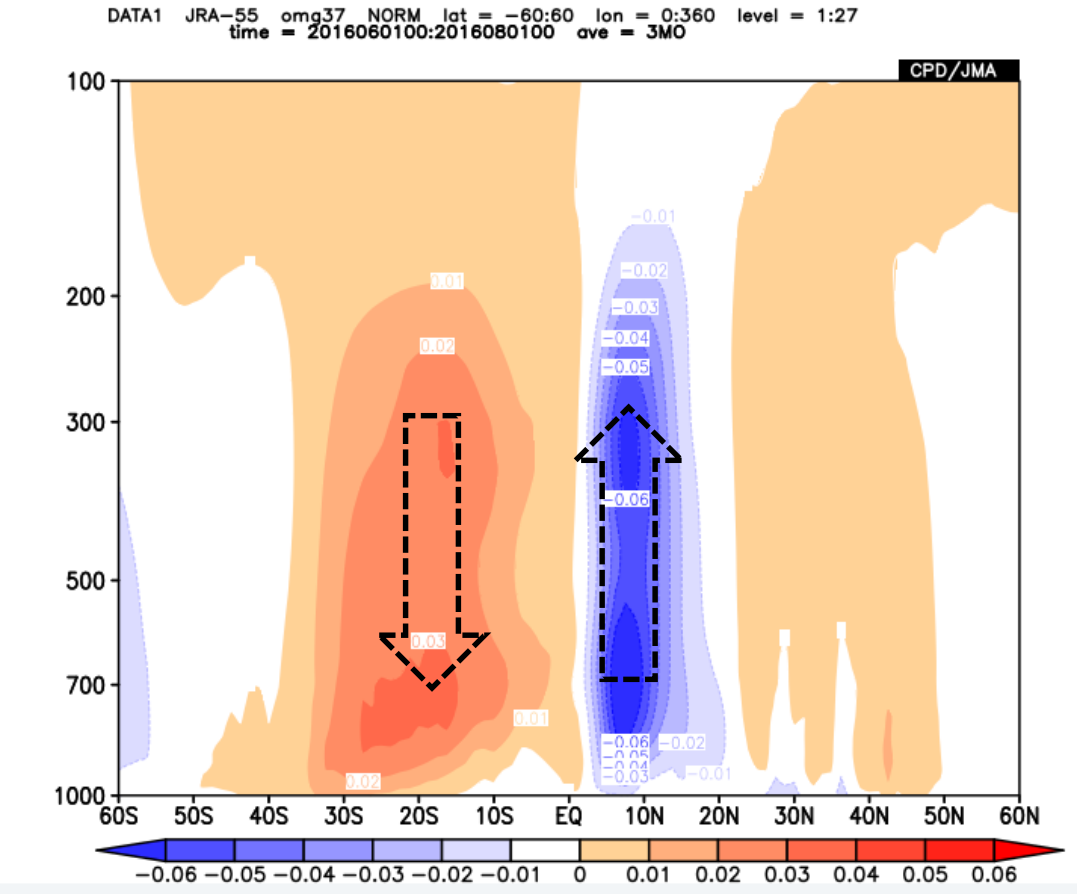


Remember that you can change the line's color by modifying this parameter.

Q5-1:Cross Section –zonal mean-

Show the climatology of latitude-height section of zonal mean* omega (pressure velocity) for June-July-August.

*zonal mean: Taking an average along a latitudinal circle



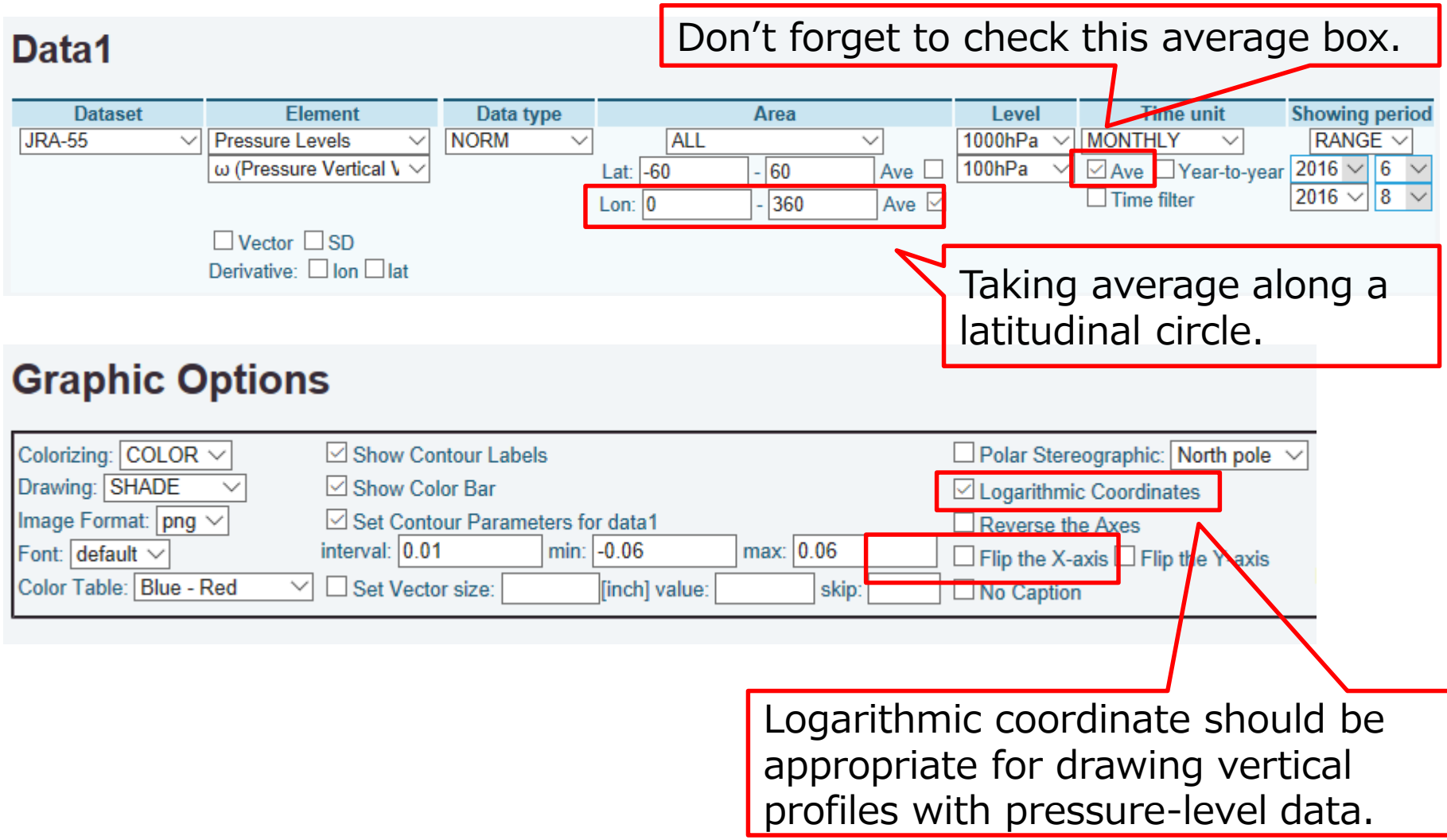
Variable: omega
Period: June-July-August

Note:
Omega is defined as

$$\omega \equiv \mathrm{d}p/\mathrm{d}t.$$

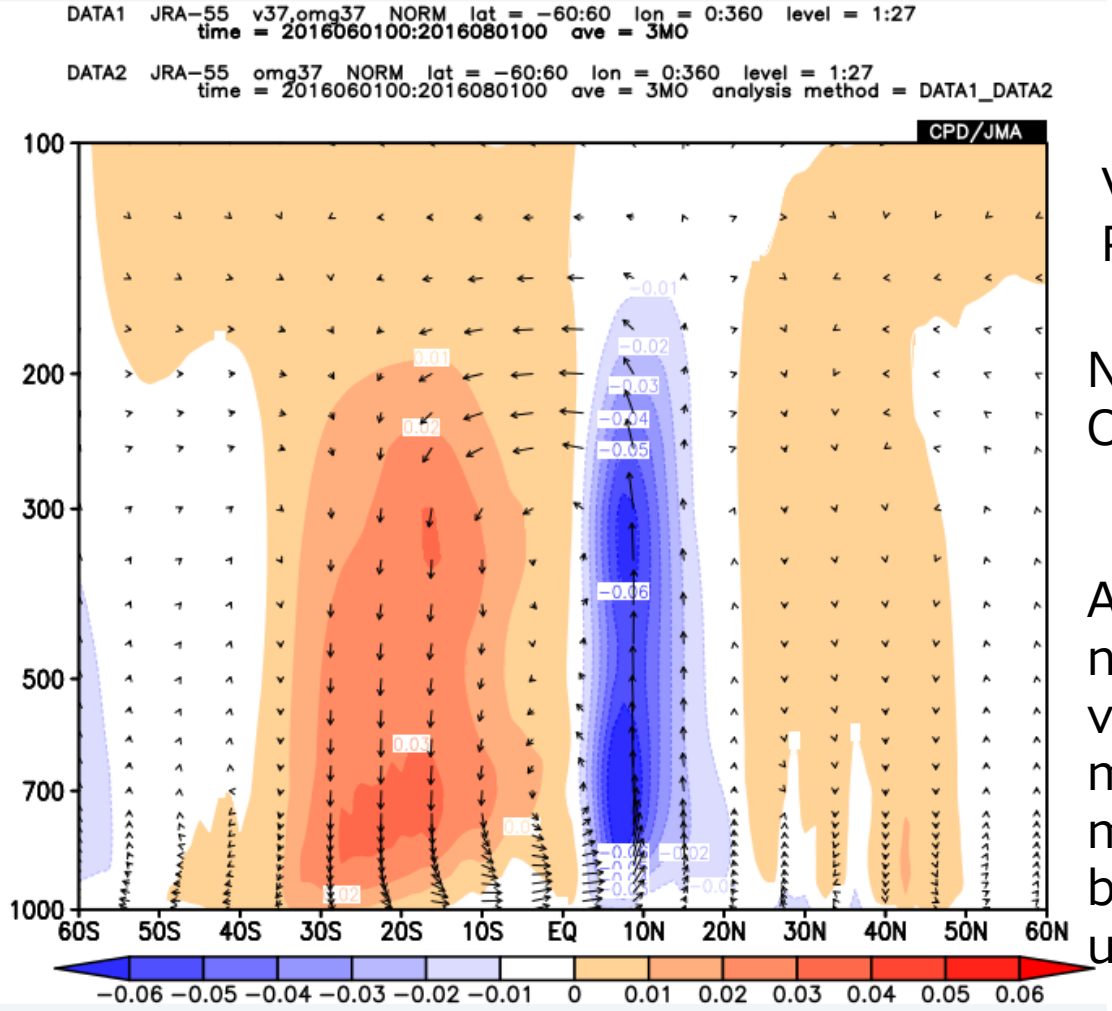
A negative omega, namely the pressure value becoming smaller, means there is an upward motion because pressure becomes smaller towards upper levels in general.

A5-1:Cross Section –zonal mean-



Q5-2:Cross Section –zonal mean-

Overlay wind vectors, namely meridional winds and vertical winds.



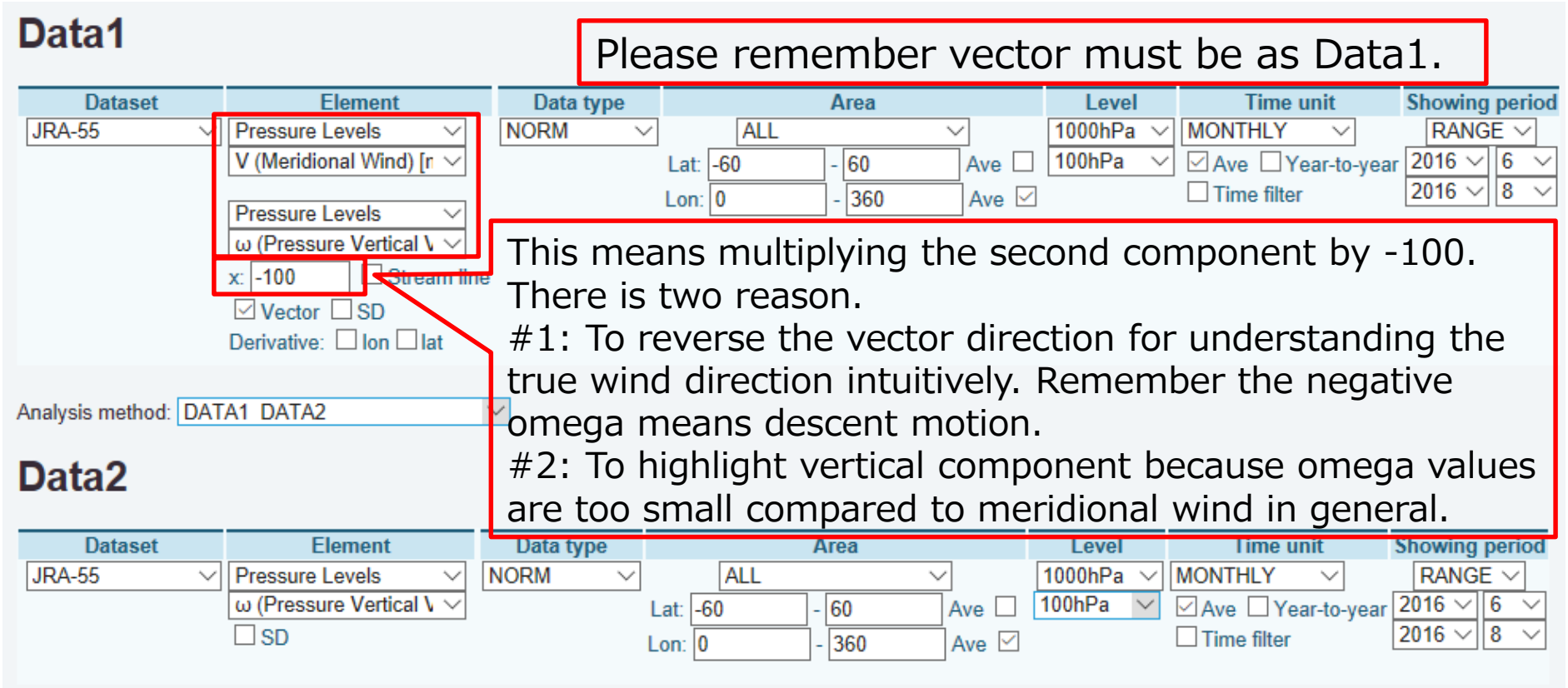
Variable: V and omega
Period: June-July-August

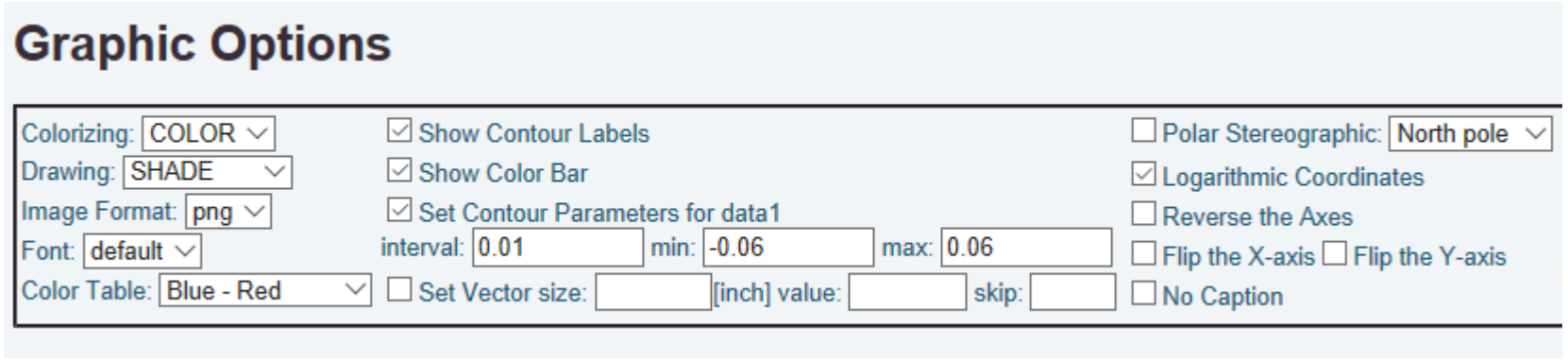
Note:
Omega is defined as

$$\omega \equiv \mathrm{d}p/\mathrm{d}t.$$

A negative omega, namely the pressure value becoming smaller, means there is an upward motion because pressure becomes smaller towards upper levels in general.

A5-2:Cross Section –zonal mean-

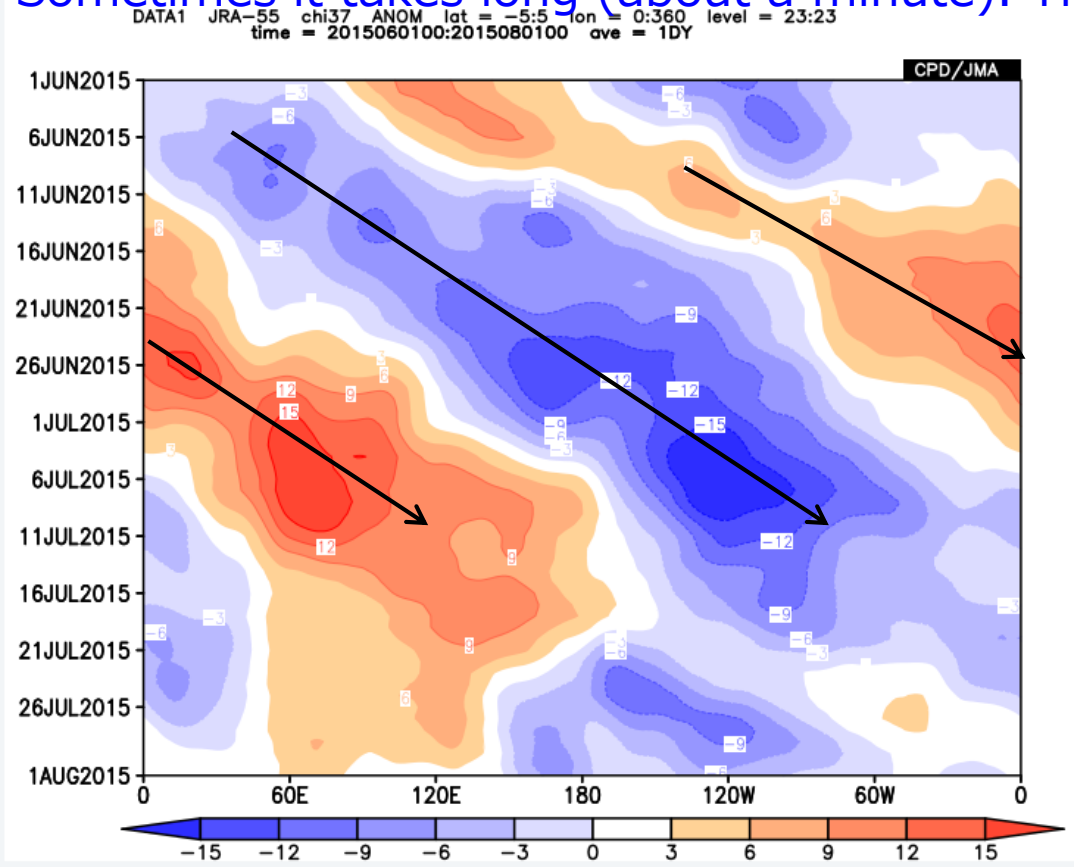




Q5-3:Cross Section –Hovmöller diagram-

Show the longitude-time cross section of 7-day running mean vector potential anomalies at 200hPa along the equator (namely, 5S-5N average) from 1st Jun through 1st August 2015.

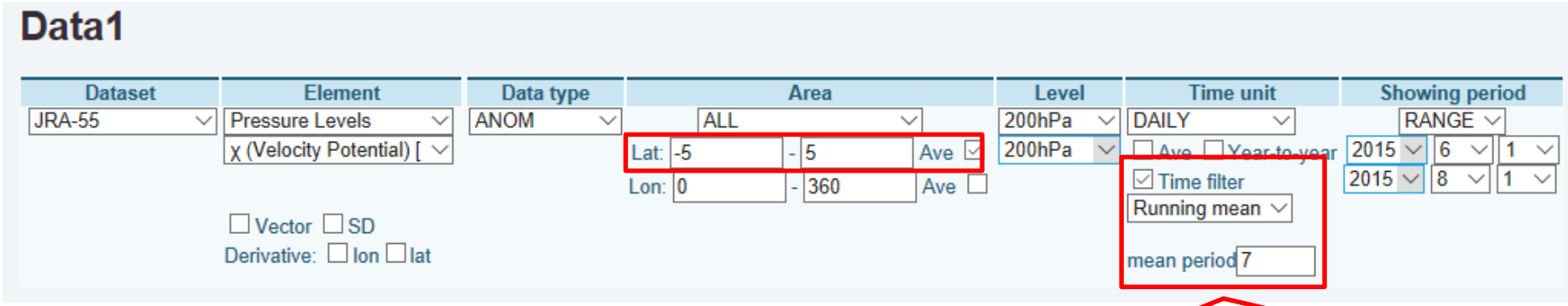
*Sometimes it takes long (about a minute). Thank you for your patience.



Variable: chi200
Period: 1 June 2015 to 1 August 2015

*This kind of map is called as a Hovmöller diagram. You can see some eastward wave propagation events in this map. Actually, they corresponds to Madden-Julian Oscillation (MJO).

Q5-3:Cross Section –Hovmöller diagram-



You can take running mean by checking this time filter box, then selecting “Running mean” and setting mean period. In this case, 7 is set. Since the time unit is daily, this means 7-day running mean.